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## THE CONTENTS

How to Tune Your Pi-Network Filter .....	2
Crystals Substitute Mechanical Filter .....	3
Time Delay Circuits for use with Mercury Vapour Rectifiers .....	5
Hints and Kinks:	
Making Coil Formers .....	6
Remote Tuning of the Cubical Quad .....	6
Coil Formers from 35 mm. Film Cassette .....	6
Multiple Position Crystal Holder .....	6
An Audible Tuner .....	6
Correspondence .....	7
Book Review:	
"Dry Battery Receivers with Miniature Valves" .....	7
Amateur Television—Part Seven	
Need Some Polystyrene Cement? Meet the Other Amateur and His Station—Arnold Holst, VK3OH	12
VK-ZL DX Contest, 1958 .....	14
National Field Day, 1959 .....	16
LTU. Fund Donations .....	17
DX .....	18
SWL .....	19
VHF .....	20
Prediction Chart for Sept. 1958	21
Notes .....	23
Contest Calendar .....	23

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## EDITORIAL



## REALISM IN SIGNAL REPORTING

A casual listening watch around the Amateur bands any day will soon reveal the inadequacy (or over-adequacy) of our present system of signal reports, if it is not already known by all. It is apparent that very little thought is given to present day signal reports that mean much to the recipient. How often do you hear a report other than 599 or 599? In contests this is especially so—you either hear them 599 or not at all.

There is little argument with the Readability part of our present RST system, which is realistically divided into five levels from R1 to R5; but what of the S and the T parts? Although on occasion one does hear an other-than-crystal signal, it appears normal to give T8 for anything from r.a.c. to a slightly chirpy signal of near d.c. note, completely ignoring the eight levels of tonal cadence. The Tone scale of reports has largely lost its usefulness especially as all stations should and most do emanate stable v.f.o. or crystal signals. This part of the report contributes nothing to the information we wish to obtain from a DX station.

Referring now to the S part of our system—the scale S1 to S9 is rarely used in its original context. Unless you receive a "60 db. over 9" report you can't be heard very well, or so it is thought. There has also always been some confusion between signal strength and readability, leading to further misunderstandings and incorrect signal reporting. Even with the advent of S meters on receivers this has probably added to our troubles. S meter steps are usually about 6 db. per S point, but, and a big BUT, above what level? Receiver noise atmospheric noise, domestic noise, or what?

Two important factors in reporting which considerably affect the pleasure of a DX contact are atmospheric noise (QRN) and interference from

other stations (QRM), yet these are often forgotten in our effort to get out that all-important "Ur sigs RST 599, OM". Even a legitimate 599 signal can become useless for the conveyance of intelligence if our next door neighbor decides to shave or his wife decides to spring-clean. The human ear, especially under the excitement and stress of a juicy DX contact, will not easily discern between nine levels of signal strength nor nine levels of tone. Which leads to the writer's contention that five levels are the maximum number which can be reasonably discriminated.

Two internationally agreed systems are at present in existence which to the writer's knowledge have never been used by Amateur stations. They are the SINPO and SINPFEMO codes, so called to indicate by the initial letters the particular receiving condition being reported. A study of both systems (which are given under the Federal Notes in this issue for information) shows a five level reference for each receiving condition on which the transmitting station requires information. Both systems offer something that is lacking in our present system—mainly a simpler and more reasonable method of five aural levels easily remembered yet providing more useful information than is conveyed at present.

The writer does not necessarily advocate the adoption of any new system as such, but merely wishes to draw attention to the inadequacies of the present out-moded system with a view to arousing interest in the subject and perhaps promoting some suggestions for a more workable and realistic approach to the Amateur method of effective signal reporting. Give this matter some concentrated thought—the Federal Executive will be pleased to receive your views.

FEDERAL EXECUTIVE.



# How to Tune Your Pi-Network Final

## Simple Procedure for Popular Tapped-Coil Systems

BY LEWIS G. McCOY, W1ICP

IT is apparent from the number of inquiries received from Novices asking how to tune a pi-network transmitter that this is a common problem. Fortunately, most of the current manufactured transmitters and those that are home-brewed have pi networks whose coils or inductance values are preset for each band. When this is the case, the tuning procedure is not very difficult.

Fig. 1 is the diagram of an amplifier with a typical pi-network output circuit. For the sake of simplicity, the band-switch has been omitted. C1 is the pi-network input or plate-tuning capacitor. L1 is the coil, or inductor, C2 is the variable loading capacitor, usually labelled **fine loading** on manufactured transmitters, and S1 is a switch usually labelled **coarse loading**. The switch connects additional capacitance in parallel with C2 when it is needed.

In learning how to adjust the controls on your transmitter, we suggest that you use a "dummy" antenna at first. A dummy antenna is a device having characteristics similar to those of an antenna system. But the radiation from it is negligible so that you can try the various adjustments without bothering anyone by putting a signal on the air.

Either by design of the antenna and its feed line (matched system) or by use of an antenna coupler between the transmitter and antenna or feed line, almost any antenna can be made (and usually is made) to look like a resistance so far as the transmitter is concerned. Therefore, a resistance can be used to simulate an antenna for testing purposes.

Ordinary house lamp bulbs are a convenient form of resistance to use in practicing the tuning of a transmitter. They have the advantage that they light up when r.f. power is fed to them and thus you can get a relative indication of power output! Thus, for instance, if you use a 60-watt lamp, and it lights up to normal brilliance when the transmitter is loaded normally, you can figure that you have about 60 watts output. You should select a lamp that has a wattage rating equal to about 75 per cent. of your transmitter's rated power input. For example, a 60-watt lamp is a good size to use for the Novice 75-watt input level. The lamp should be connected across the output terminals of the transmitter, with short leads.

### TUNING THE PI-NETWORK

Before turning on the power to the amplifier or closing the key, the output capacitance should be set at maximum

capacitance. This means that C2 should be turned so that its plates are fully meshed and S1 should be turned so that all the fixed capacitors are connected. Instruction books of manufactured transmitters usually tell you which positions are maximum capacitance.

When power is first applied and the key closed, the reading on the plate-current meter will probably be above normal for the tube. The reason for this is that the output circuit is not tuned to resonance. But as you tune C1 through its range, you will find a point where the plate-current reading on the meter drops sharply. If you turn C1 still farther, you will find that the plate current rises to a high value again. The correct tuning point is the one where the plate current is minimum. This point is often referred to as the point of **plate-current dip**, or **point of resonance**.

tuned to the correct operating frequency. The only difference between a straight amplifier and a doubler or tripler is that the output circuits of the latter are tuned to the second and third harmonics of the frequency fed to the grid, while the output circuit of the straight amplifier is tuned to the same frequency as that fed to the grid. In some manufactured transmitters, the tuning range is restricted so that it is impossible to tune to any frequency except in the band for which the band switch has been set. In others, and in many home-built rigs, the tuning range is so great that both the correct operating frequency and its second harmonic (twice the operating frequency) can be tuned to within the range of C1. In such cases, a plate-current dip will be found near maximum capacitance of C1 (usually the correct one at the operating frequency) and a second dip near minimum cap-

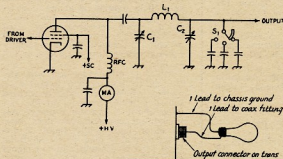


Fig. 1.—Circuit diagram of a typical pi-network tank circuit. C1 is the input or plate-tuning capacitor, C2 is the output or loading capacitor. S1 is used to switch fixed capacitors in parallel with C2 to avoid the need for a much larger variable at C2.

The amplifier should not be operated off resonance any longer than it takes to tune the output circuit to resonance because the large input power that the amplifier draws when it is tuned off resonance is not converted into useful r.f. power but is dissipated in heating the tube elements to the point where the tube may be permanently damaged. (We have seen some Amateurs who thought they were loading the amplifier when they tuned off resonance because the plate current was higher!)

It is probable that on the first trial the plate current will dip to a very low value and the load lamp may not show any light at all. The low value of plate current means that the amplifier is not drawing much input power and therefore we can't expect much output power. The reason that the amplifier is not drawing much plate current is that the load is loosely coupled to the amplifier. Adjustment of the loading controls, C2 and S1, will increase the coupling to the load and the amplifier will draw more input power.

### CHECKING RESONANCE

However, before proceeding with the loading adjustment, it is most important to make sure that the amplifier is

acidity where resonance occurs at twice the operating frequency.

Naturally, care must be used to avoid tuning the transmitter to the second harmonic. If your operating frequency is in the 3.7 Mc. range, and you make a mistake, you'll land on 7.4 Mc.; if your operating frequency is supposed to be in the 7.1 Mc. range, you'll be radiating on 14.2 Mc.

In some transmitters there may be responses at other frequencies generated in driver stages. The moral is: If you find more than one dip in plate current, check with an absorption wave meter.<sup>2</sup> (This check should also have been made at the grid of the amplifier to make sure that it is being driven at the correct frequency.)

### LOADING THE AMPLIFIER

Once you have determined the correct setting for C1, you are ready to start adjusting the loading by means of C2 and S1. Both of these have been previously set to put maximum capacitance in the circuit.

First, turn the variable capacitor C2 toward minimum capacitance while

(Continued on Page 5)

<sup>2</sup> Reprinted from "QST," Feb. '58.

<sup>1</sup> The resistance of a lamp bulb changes with temperature so that it cannot be used for accurate measurement. Also, the resistance of the lamp bulb at maximum will usually be higher than the 50 or 70 ohms most antenna systems are designed for. Nevertheless, pi-network adjustments will be similar.

<sup>2</sup> McCoy, "The Band Checker," "QST," Nov. '56.



# Crystals Substitute Mechanical Filter

BY RUDY FAESSLER,\* HB9EU

FOR many years, an i.f. crystal filter in a communications receiver has been standard equipment for a high quality communications receiver in the medium price class. The classic arrangement, Fig. 1, is well known to every Ham and for many years it has proved an excellent help for thousands of Hams around the world.

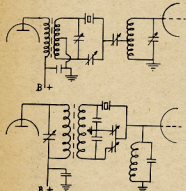


Fig. 1—Two variations of normal xtal filters.

All Amateurs who have used such a crystal filter know that it has some disadvantages. If we take a critical look at the resonance curve of such a filter, Fig. 2, we find two special disadvantages:

1. The absence of a so-called "flat-top"
2. The curve looks like a triangle, with the skirts too broad.

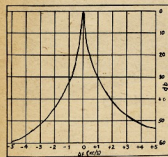


Fig. 2—Resonance curve from a classic xtal filter of Fig. 1.

Of course crystal filter circuits have been developed, Fig. 3, which give better rectangular curve-forms, but they are more complicated to construct and to tune properly, and they take more parts. Such filters cannot usually be built without some precision measuring equipment.

This article will discuss a crystal filter circuit which is easy to build and tune, and which will give ideal band-pass form which every DX man needs in his receiver.

\* Chamerstr. 68-D, Zug, Switzerland.

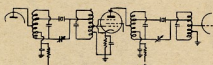


Fig. 3—Typical circuit of a triple xtal filter.

Looking at the curve form, Fig. 4, of a prototype of such a filter, with diagram in Fig. 5, you will see that it is nearly the same as that of a mechanical filter. You will also notice that the circuit includes no coils and that it can be constructed in a very small space on a chassis.



Fig. 4—Resonance curve from Fig. 5.

Bandwidth at  $-3$  db. equals 400 cycles.  
 $U_0$  equals 400 Kc.  
 $\frac{U_0}{U_1}$  equals 31.7 db.  
 Crystal (Type FT241-A) frequencies:  
 CR1 equals 400.18 Kc.  
 CR2 equals 399.84 Kc.  
 CR3 equals 400.00 Kc.

The circuit is a three-stage "staggered-tuned" amplifier in which each stage includes a cathode-follower followed by a degenerative amplifier in a cathode-bias circuit.

Fig. 5—Circuit diagram of the three stage "staggered tuned" filter.

C1—1000 pF.  
 C2—10,000 pF.  
 Cn—see Text.  
 R1—470K ohms.  
 R2, R3—1,500 ohms.  
 R3—100K ohms.  
 R4—1K ohms.  
 R6, R7—4,700 ohms.  
 Rq—See Text.

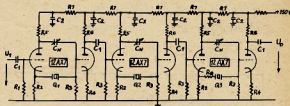


Fig. 7a shows such a stage alone. The signal  $U_1$  produces on the cathode resistor of V1, a signal with the same phase, which is coupled by a crystal  $Q$  to the grid of V2. As the crystal is the equivalent of a series-resonance circuit, with very high  $Q$ , so only signals with the crystal resonance frequency will pass through from cathode V1 to the grid of V2. Every crystal includes a real part and a shunt capacity. The latter one (crystal holder capacity) must be eliminated. This is accomplished through  $C_n$  which couples a signal with a phase-shift of  $180^\circ$  from the plate of V1 through the neutralizing capacity  $C_n$  to the grid of V2. The value of  $C_n$  should be approximately the same as the holder capacity of the crystal  $Q$ .

To give a better understanding of the function of the circuit, Fig. 7b presents one stage again with its main circuit

elements, and Fig. 7c is the equivalent circuit showing their functions.

To calculate the gain of a stage on its resonance frequency, the following equation can be used for nearly exact values:

$$\frac{U_0}{U_1} = \frac{I_q Z_{ci}}{U_1} = \frac{Z_{ci}}{R_1 + R_q}$$

If  $R_1$  is large in respect to  $Z_{ci}$ , then  $R_1$  must not be included in the calculation.  $R_1$  is the internal resistance of V1,  $R_q$  is the resistive part of the crystal,  $Z_{ci}$  is the reactance of the input capacity of V2 plus the wiring capacity.  $I_q$  and  $C_q$  are the real components of the crystal.

Fig. 6—An application of 1600 Kc. on circuit of Fig. 5.

Bandwidth at  $-3$  db. equals 24 Kc.  
 Gain at 0 db equals 1600 Kc.  $\pm 5$  db.

Crystal frequencies:  
 Q1 equals 1601 Kc.  
 Q2 equals 1599 Kc.  
 Q3 equals 1600 Kc.



To get the desired flat-top with a ripple (top to valley response of the resonance curve) of approximately 3 db, it might be necessary to add a resistor (non-inductive type) in series (Continued on Page 5)

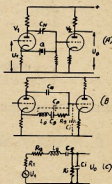


Fig. 7—Equivalent circuit from one stage of Fig. 5.



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Comparative Measurements:	Ratio 0.1 to 10.0 with switch on "EXT" Ratio 0.8 to 1.25 with range switch on "5%" (-20% to +25%).

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# TIME DELAY CIRCUITS FOR USE WITH MERCURY VAPOUR RECTIFIERS

BY S. T. CLARK,\* VK3ASC

**M**OST Hams are familiar with the advantages of mercury vapour rectifiers—low voltage drop and high efficiency compared to vacuum rectifiers. Since it will undoubtedly be a number of years before the "silicon" types, with their even higher efficiency, become cheaply available and we can throw out our rectifier filament transformers, I propose to give a short dissertation on ways of preventing your prized 83 or 866s from finding a premature grave in the dust-bin.

The first, but not the most reliable, method of preventing premature failure is to switch the rectifier filaments on and wait for up to fifteen minutes—take careful note of the manufacturer's recommendations in this respect.

The second, inexpensive method is to switch the heaters on before the evening meal and switch the h.t. afterwards. The trouble with these two methods is that in the case of the first, impatience is likely to cause us to take a risk because we hear a rare one calling CQ, or in the second, our "forgetteries" work overtime and the filaments don't get much warm-up time.

What we need are inexpensive (the cheaper the better) means of overcoming premature switching without too much delay. T. R. Baker, VE3AXC, describes a grid system in May "QST"; but Amperite 115N030 thermal delay relays are not available in Australia unless you have a U.S. friend who sends Xmas and birthday presents.

What can the VK Amateur do to solve his problems? There are a number of time delay systems that can be put to good use, preventing premature deaths in your family of rectifiers.

The first of these is to use a relay, 24 volt type, with at least two sets of contacts that will carry about two amps. at 240 volts, operated by the bleeder current of a low-power bias or driver-multiplier power supply. (In the case of the latter, a "3000" or similar low current type operating microswitch is recommended.)

The amount of delay required is set by using a resistor in series with the tube heater to slow up the heating of the cathode so that the relay only closes after the required time interval. In building such a unit it is necessary to ensure that the relay closes OK on the bleeder current, and in the case of a bias pack, this can easily be 40 to 60 mA. as a stiff supply is needed for bias purposes. Using the bias supply also has the added advantage that if the bias fails, your transmitter will be switched off and so the equipment "fails safe".

To come back to our two sets of contacts, even the youngsters will see that one set of contacts are going to be used to switch the a.c. to the h.t. transformer, but what about the other set? You are right, they are used to short circuit the resistor so that the tube

operates with its rated heater voltage applied and so is able to give of its best. Any rectifier with a cathode can be used—5V4G, 6X5GT, 6X4, 6V4, etc., although the low current types such as the 6X5, etc., are the easiest to control.

The second method that can be used is to use a 3 or 5 watt resistor to heat a brass rod and cause that to operate a microswitch, through a simple "multiplying" lever system if necessary. In fact, some microswitches require so little movement to operate them that you will probably find that the ceramic tube on which the resistor is wound expands enough to operate the switch. In this case the "delay" is set by an adjusting screw positioning the resistor correctly and the application of the correct voltage to the resistor causing it to heat up enough, but not too much. (Take note of ratings.) You will also need to make sure that the resistor is of the vitreous type, i.e. I.R.C. or similar.

The third method is to use a disposals time delay relay, if you can find one.

The fourth method is to approach United Radio Distributors, or British Merchandising Pty. Ltd. (both in Sydney), or ask your favorite dealer to obtain for you one of Ediswan's series of DLS series delay relays. They are vacuum delay relays with 4-pin British or octal bases for operation from 4 or 6 volt a.c. supplies, and they are relatively inexpensive.

Don't shy away from the 4v. versions either because a resistor will soon modify them for operation on some other suitable filament voltage. You can calculate the required resistance value using Ohms Law and make it up from a piece of resistance wire or buy one of suitable resistance and power rating, as usually only 1 to 5 watts will be required.

Don't worry about the "delay" being shorter if your rig has only been switched off for a very short time. If the "delay" has not had time to cool, it is certain that the rectifier will still be full of vapour.

Generally speaking it is the "cold start" that does the damage and it is usually recommended that you wait fifteen minutes before switching on the h.t.

I believe that time delay protection of m.v. rectifiers is well worth while, even though you can buy them from "Dan", "Snow" or "Mac" for about £1 per 866. It is always wise to remember that the abovementioned gents will not be available when you do the wrong thing and up goes a pair of rectifiers.

## FOR YOUR OWN SAFETY

In making connections between power supplies and apparatus, always place the socket on the power supply so that accidental contact is not possible. DEATH IS SO PERMANENT!!!

## HOW TO TUNE YOUR PI-NETWORK FINAL

(Continued from Page 2)

you watch the amplifier plate current (which has been previously adjusted to the dip at resonance). The plate current should start to rise. As soon as it has risen a noticeable amount, re-adjust C1 to the bottom of the dip in plate current. You will notice this time that the dip in plate current is less pronounced and that the current does not dip to as low a value as it did previously. This indicates that the amplifier is beginning to take more power. As the plate current at the dip point begins to rise, you should notice that the load lamp will start to get brighter, indicating that as the amplifier begins to take more power input, it produces more power output. Also notice that when you tune C1 away from the plate current dip the plate current will increase but that the output power will be reduced.

If the plate current at the dip is not up to the rated value for the amplifier tube when you have reached minimum capacitance on C2, return C2 to the maximum capacitance setting, turn S1 to the next position and repeat the same procedure. The process should be continued, advancing S1 one position at a time, until the amplifier is drawing rated plate current at the plate-current dip. By the time the amplifier is fully loaded, the dip in plate current will have become relatively broad. Adjustment of the capacitances will become more critical as the frequency of operation is increased.

In most transmitters you will find that you can increase the loading until the amplifier is drawing considerably more than rated plate current, and you may get some corresponding increase in power output. However, you should not operate the amplifier this way if you expect to get normal service life from the amplifier tube or tubes.

## CRYSTALS SUBSTITUTE MECHANICAL FILTER

(Continued from Page 3)

With the crystal to keep the Q of the crystal in the middle of the bandpass curve-down (Rq in Fig. 5). This value must be calculated experimentally. Also the bandwidth can be changed this way, within small limits.

Needless to say, that for extremely sharp bandpass, it is possible to use a single stage with only one crystal or two stages with the crystals on exactly the same frequency. Also it is possible to use four stages in the same manner as Fig. 5 presents.

The discussed filter circuit can be used for frequencies from 200 Kc. to 2 Mc. Receivers with a 1600 Kc. i.f. have bad selectivity if coils are used in the filter circuit. Cross modulation is the trouble with such receivers. With a three-stage "staggered tuned" crystal filter, cross modulation can be eliminated completely. A typical curve of such a filter is shown in Fig. 6. The filter circuit is very useful for many other Ham improvements.

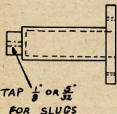


SIMPLE DESIGN COVERING ALL BANDS FROM 1.8 TO 30 Mc.

## MAKING COIL FORMERS

How often has a Ham over the years turned his junk upside down to look for something to wind a coil on? In my case, many times, and it is only within the last couple of months that I have found the answer, and here it is.

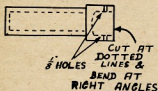
As you know, when a doctor uses a Penicillin syringe the plunger and cylinder are thrown away as useless, but I had a brain-wave. The material of which these syringes are made is Polyethylene, which is also the insulating material in co-axial cable, and the shape as you will see by the sketch, makes them an admirable coil former  $1\frac{1}{2}$ " long and  $9/16$ " diameter with a  $\frac{3}{8}$ " hole. This constitutes the syringe and another form is made from the plunger  $1\frac{1}{4}$ " long  $\frac{7}{8}$ " diameter with  $\frac{1}{4}$ " hole. Both pieces can be slug-tuned, one with  $\frac{3}{8}$ " slug, and the other with a  $\frac{1}{4}$ " slug.



To make these formers I proceeded as follows:

Firstly, I pulled out the needle with pliers, then I drilled a  $\frac{1}{8}$ " hole through where the needle was removed and tapped  $5/32$ ". This is standard for a  $\frac{3}{8}$ " slug. In the case of the plunger, the end was drilled and tapped  $\frac{1}{4}$ " to accommodate a standard  $\frac{1}{4}$ " slug.

Now this material lends itself to threading on a lathe, and I have made a number with 16 and 32 turns per inch. I drilled  $\frac{1}{8}$ " holes in the flange of the cylinder for holding-down screws. In the case of the plunger I cut out pieces as shown in sketch, bent the lugs remaining at right angles, and drilled  $\frac{1}{8}$ " hole through each side for holding down purposes.



If one wants to use slugs from the top of chassis, a small piece of wood or perspex turned and tapped to fit the screws of the slugs can be cemented into the cylinders, which also allows the coils to be wound well away from the surrounding metal.

Of course, it is not necessary to thread the cylinders so that a close wound coil can be used instead. When the coils are wound, cement them in position (with the tension still on) with any cement you have on hand. In

The tuner to be described was devised for a blind Amateur so that he could accurately resonate his p.a. tank circuit and, with the p.a. switched off, tune the exciter for maximum drive. It can also be used as a monitor for both c.w. and phone, and is useful wherever a simple wavemeter is needed. No originality is claimed for the design, but it is put forward in the hope that it will be of help to other sightless operators.

It will be seen from Fig. 1 that the unit consists of a tuned circuit, a diode r.f. rectifier (V1), and a triode audio oscillator (V2). The only power supply needed is for the heaters of the two valves.

In operation, the tuned circuit is set to the centre of the desired band and a small amount of r.f., picked up by a short length of wire attached to the aerial terminal, is rectified by V1 and used as h.t. for V2. V2 then oscillates, and a note is heard in the headphones.

\* Reprinted from R.S.G.B. "Bulletin," April, '58.

As the driver or p.a. tank is tuned to resonance, the amount of r.f. picked up by the tuner increases, thus causing the volume of sound in the phones to increase.

By this means the transmitter can be peaked up as accurately as if the operator were watching a meter.

The switch S2 prevents oscillation when the tuner is being used as a phone monitor.

Construction is simple and the component values and layout are not critical. The transformer T1 provides the anode-to-grid coupling to make V2 oscillate and couples the output via a low impedance winding to the headphones. The transformer used in the original unit is a surplus item numbered ZA14587, but any transformer with similar windings, such as the modulation transformer from a Wire-less Set No. 17 or the output transformer from the "A" set of a WS19 should be suitable.

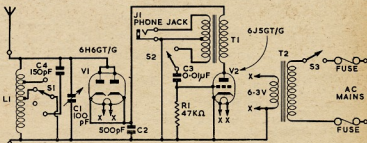


Fig. 1.—Circuit diagram of audible tuner. C1 is the main tuning condenser, C4 being switched in for 1.8 Mc. by wavechange switch S1. L1 is 30 turns 26 s.w.g. wire on 1 inch diameter former, tapped at five turns for 10, 15, 20 metres, and at 15 turns for 40 metres.

my case I use perspex dissolved in chloroform.

You will find in the cylinder a rubber bucket. Push this out, drill a hole through the centre and you will have a rubber grummet ideal for insulating wires through chassis, etc.

—W. H. Hannam, VK2AXH.

## REMOTE TUNING OF THE CUBICAL QUAD

A great help in receiving through QRM with a cubical quad antenna is being able to phase out interfering stations by adjusting the quad's reflector at the operating position. This may be done with receiving-type twin-lead and a 360 pF. variable capacitor.

Attach one end of the twin-lead to the junction of the reflector and the tuning stub and the other end to the capacitor which has been mounted at the operating position in the shack. Set the capacitor at half capacitance and then adjust the stub for maximum front-to-back ratio as is normally done.

I can adjust for front-to-back ratio over the entire 21 Mc. band with this arrangement. The forward gain remains essentially the same regardless of the

setting of the capacitor, but interfering signals from the back may be reduced an average of 30 db.

—Capt. J. R. Hagen, K4JMA, "QST," Feb. '58.

## COIL FORMER FROM 35 MM. FILM CASSETTE

A useful coil former is readily available in a well known 35 mm. film cassette. The black spool is styrene and being hollow can be adapted to take a slug.

—G. Bills-Thompson, VK3AHN.

## MULTIPLE POSITION CRYSTAL HOLDER

A simple and inexpensive holder for a group of crystals may be made by mounting salvaged tube socket clips in a sheet of plastic.

Holes drilled to accommodate the clips should have a diameter slightly smaller than that of the clips. This will allow the clips to be force-fitted into place. Heating each one with a hot soldering iron will seal it to the plastic. Naturally, the heat should be applied with caution so as not to completely melt the holder.

—L. F. Lind, K4AWQ ("QST," Mar. '58)

## CORRESPONDENCE

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

Editor "A.R.," Dear Sir,

When working George VE2LI (ex-G5LI) recently, I mentioned the late VK5BY, knowing that they were old friends.

George was very shocked at the news of Doug's death as they had many QSOs over the last 25 years from both G5LI and VE2LI.

He specially requested that his great sorrow be expressed in the VK Ham Journal and that his sympathy be extended to Doug's widow and family, and also to the W.I.A. at the loss of such an outstanding member.

—H. M. Roberts, VK5MY.

### COUNCIL OF ADULT EDUCATION OF VICTORIA CLASSES

Editor "A.R.," Dear Sir,

Readers of "Amateur Radio" may be interested to learn that the Council of Adult Education of Victoria will be holding a class for those interested in practical electronics.

The class is experimental in so far that instead of the students being asked to work on a set project, they will be invited to come up with anything they are actually working on and an attempt will be made to develop the lectures around the immediate practical needs of the members of the class.

The C.A.E. is anxious that information about this class should reach as

many technically minded people as possible and if you could assist in giving any publicity I would be very grateful.

[Details of the class are shown hereunder.—Editor.]

### ELECTRONICS FOR THE HANDYMAN

Mr. R. Hartkopf  
Adult Education Centre,  
114 Flinders Street,  
Melbourne.

7.45 p.m. — 9.15 p.m.  
Beginning September 18  
Thursdays.

This course is exclusively for people who are actually working on some electronic gadget—anything from a crystal set to a hi-fi or an electronic brain.

Practical experience gained by class members working on their individual projects will be linked with basic theory, thus enabling them to expand their knowledge.

Duration of course: 10 weeks. Fee: £2/0/0.

### ADDITIONAL FREQUENCIES FOR VK2WI BROADCASTS

There are now three transmitters in full operation at VK2WI, Dural. The frequencies used on the Sunday broadcasts are: 3575 Kc., 7146 Kc., and 146.0 Mc. Call-backs are taken on 7050 Kc. at present.

During August, the transmitters commenced operation on full power after the supply authorities connected in a pole transformer about 400 feet away from the transmitting room. Previously power had to be drawn for over two miles away.

## BOOK REVIEW

### DRY BATTERY RECEIVERS WITH MINIATURE VALVES

By E. Rodenhuis

Here is yet another absorbing volume from the prolific Philips Technical Library.

Even the advent of television has not reduced the popularity of the dry battery portable type receiver. In fact they appear to gain in favour each year.

Although transistors are beginning to make their way on to the local market, they are as yet not available in sufficient quantities to seriously challenge the miniature valve.

From an Amateur point of view these tubes have obvious applications in portable emergency gear.

Chapters in the book are devoted to a full discussion in the use of dry battery valves and include sections on valve types, circuit design, electronic tuning indicators, and typical circuits.

One interesting feature is the use of these valves in high frequency f.m. circuits.

Unfortunately all the valves described are European types and are unavailable here. However, as full data is given on each one, it would not be hard to substitute a local equivalent.

Our copy from Philips Gloeilampen-fabrieken, Holland.

The book is available from Philips Electrical Industries Pty. Ltd., 69-73 Clarence Street, Sydney. On information supplied, the price is 32/6 Sterling.

## THE "MACRON" CRYSTAL TURNOVER PLAYER CARTRIDGE TYPE H.F.11

Made in Australia to suit Australian conditions

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### LET US LOOK AT THE FACTS:

- ★ Clip-in insert. Can be replaced without removal of mounting bracket.
- ★ Half inch and centre mounting interchangeable with standard arms.
- ★ Robust construction with positive positioning for "Standard" and "Longplay" positions.
- ★ Non-hygroscopic adhesives used throughout in the manufacture of the crystal element.



- ★ Slip-in Sapphire styli, interchangeable with standard makes.
- ★ Replacement styli available, also fit other standard cartridges.
- ★ High compliance, which ensures good tracking, thus resulting in low record wear.
- ★ Wide frequency response, enabling the utmost realism from modern wide-range recordings.
- ★ Attractively and safely packed in sealed clear-plastic container.

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# AMATEUR TELEVISION

## PART SEVEN

BY E. E. CORNELIUS,\* VK6EC/T

### TESTS AND MEASUREMENTS

To obtain optimum performance of the camera chain, certain test equipment and test charts are invaluable. The important checks to be applied are:—

1. Scan linearity.
2. Frequency response.
3. Low frequency phase response (square wave).
4. System gamma.
5. Pulse durations, rise and fall times.

**Scan Linearity** will be discussed first, and requires the use of a test chart and a grating generator. The grating generator is designed to provide a grid, grating or crosshatch pattern on the picture tube, with 20 vertical bars, 17 of which should be visible, and 15 horizontal bars, 14 being visible, the remainder being lost in blanking.

\* 157 Wood Street, Inglewood, Western Aus.

A corresponding test chart is made, having 17 vertical rows of circles, and 14 horizontal rows. This is scanned by the camera, and reproduced on the monitor. The grating is superimposed electrically, and with perfect scan linearity, the bars fall centrally across the corresponding circles.

The circles are made such that the width of the inner white circle is 1.5% of screen width, and that of the black outer circle is 3%. Then the displacement of any bar can be measured as a percentage.

Fig. 31 shows the test chart, with important dimensions. In the top left hand corner is shown a part of a superimposed grating showing accurate linearity. The chart is made from show-card paper, with black Indian ink, and glued to masonite.

The chart alone will not show scan linearity in either camera or monitors. If the camera is scanning too fast on

the right, on a linear monitor, the right hand side of the pattern will be compressed. An equal and opposite non-linearity of the monitor can exactly cancel this by expansion on the right (the most common condition) resulting in apparent perfect linearity of both. A linear monitor, however, would show up the camera non-linearity.

### Method—Camera Linearity

Set up the camera on the chart and adjust the scan width and height to just show the edge arrows on the monitor. Not the viewfinder, as this shows slightly more picture width and height, due to the non-standard blanking provided from the drive pulses.

Superimpose the pattern from the grating generator, panning and tilting the camera slightly to obtain register of the centre V and H bars with the centre of the pattern. The grating signal can be mixed by feeding into the mixer, or via a series resistor of the

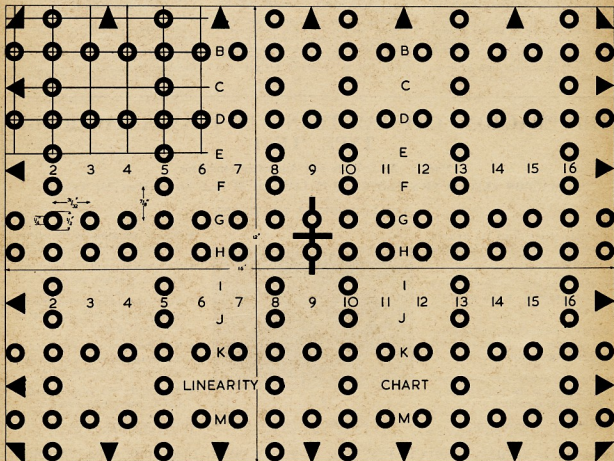


FIG. 31.—LINEARITY CHART





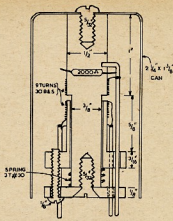
# **Video Sweep Generator**

In this generator, the fixed oscillator operates on 16.5 Mc. doubling to 33 Mc. The swept oscillator is a reactance tube type, on a fundamental frequency of 11 to 13 Mc., and tripled. The sweep is unidirectional or offset, with 11 Mc. as the rest frequency, by means of the bias arrangement in the sawtooth output circuit.

The 11 to 13 Mc. sweep is passed through a tripler limiter, and mixed in a germanium diode with the fixed 33 Mc. The 0-6 Mc. video output, is amplified in a video amplifier, and about 1.0 volts peak to peak is available from the cathode follower output. See Fig. 33.

The sawtooth generator V1 is a blocking oscillator at 25 c.p.s. synchronous with the mains. The sawtooth, of amplitude 5 volts p/p. is biased with -5 volts to make it unidirectional in polarity, and then fed through a potentiometer (sweep width) to the reactance modulator. As the maximum percentage deviation required is high, 2 Mc. in 11 Mc., a cathode follower tube reactance tube modulator is used (V2, V3), varying the frequency of the oscillator tube V4, tripling in its plate circuit. In order that the zero video frequency, which occurs at about 50 Kc. before locking of the two oscillators takes place, should always be at the left of the c.r.o. display, regardless of sweep width, a set zero control is provided, which corrects zero drift.

The two-stage 33-39 Mc. amplifier-limiter, V5, V6, uses over-coupled transformers for flat response. Details of these transformers T1, T2, T3 are shown in Fig. 34. Tuning of primary and secondary is by means of a twisted pair of 12 gauge plastic wires, about  $\frac{3}{4}$ " long.



**FIG. 34-33-39MC TRANSFMR**

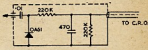
The coupling between primary and secondary is variable, and this is used in final adjustment to flatten the swept video output level over the full range.

The fixed oscillator V7 uses the grid-screen circuit for the oscillator on 16.5 Mc., and doubles in its plate circuit in the transformer T3. It was found that if the tube was worked on the fundamental, its frequency was pulled by the swept oscillator, and locking occurred. The mixer diode is an OA54, having a 1,000 ohm load, feeding the grid of the video amplifier V8. Output at low impedance is available at the co-axial output connection from the cathode follower V9. C.r.o. sync is effected from the positive pulse from the cath-

ode of V1, at 25 p.p.s., fed to another co-axial outlet.

## **Detector Probe**

This is shown in Fig. 35. The germanium diode, resistors and capacitors are mounted inside, with a short low capacitance probe mounted on one end. It introduces about 1.5 pF. additional capacitance, and this can be ignored on low impedance circuits and allowed for on high. Its output can be taken to the vertical amplifier of any standard c.r.o.

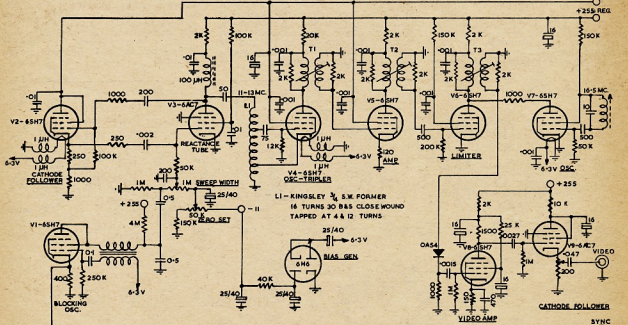


**FIG. 35-PROBE**

## **Operation**

The sweep generator injects a signal at the appropriate level and impedance to the unit under test, and the probe is coupled across the correctly terminated output. The level of the detected envelope of the swept video is displayed on the c.r.o. screen as a line as in Fig. 36A. As it stands it is meaningless, as the reference zero is missing.

In the c.r.o. used, a car radio type vibrator, its reed loaded with wax to resonate at 50 c.p.s., is run from the filament line and is arranged to short circuit the probe output at 1/100 second intervals. This dots in the zero base line and enables the deviation of the trace from the ideal straight line to be assessed. See Fig. 36B. The response of the individual unit must be very good, as a 1 db. droop per unit, results



**FIG. 33-VIDEO SWEEP GENERATOR**





will probably be able to locate a chart or have one copied.

For checking gamma, the camera views the chart and the system adjusted for the best picture and the correct levels. Then the monitor is used to check that:

1. The video levels are correct for full black and white.

2. The monitor shows optimum rendition of full black and white from the chart.

Then if the system gamma is correct, each of the ten steps of the grey scale should be clearly visible. If not, adjust the "set gamma" control, making sure that the system gain and the output levels remain constant the while. If a compromise is necessary, some degree of white compression is less objectionable than black compression.

#### Pulse Duration, Rise and Fall Times

The A.B.C.B. has laid down standards for sync. and blanking pulses, a copy of the Standards being available from the Board on request. Measurement of pulse duration can easily be made by the "Pulse Cross" display described in Part 6, published in August, but evaluation of pulse rise and fall times is not so easy.

In the equipment described, the sync. and blanking pulse rise times are all well within the specifications at all points in the chain. Measurement is best done with a c.r.o. of wide bandwidth, 3 Mc., or better, and triggered sweep, in order to be able to display a pulse over a large part of the screen. The rise and fall time for all horizontal pulses is between 0.2 and 0.4  $\mu$ sec. measured from levels 10% to 90% of maximum amplitude.

A method of measurement, using normal sweep, is as follows: Display two pulses on full screen, say 4" from leading edge to leading edge. This is

64  $\mu$ secs., i.e. 16  $\mu$ secs. per inch. Check the pulse width, and adjust to the standard. If a sync. pulse, adjust to 5  $\mu$ secs., i.e. 5/16".

Now using sweep expansion, spread one sync. pulse as wide as possible, say 1". Measure now from 10% to 90% of the height, the rise and fall times should be less than 0.4  $\mu$ sec., which is 0.08" say 5/64".

These tests enable a complete evaluation of the performance of a camera chain, and the use of the three charts, linearity, streaking and R.T.M.A., enable periodic checks to be made quickly.

I had hoped to be able to describe the video c.r.o. in this part, but as a complete description is too lengthy, it will be dealt with in full in Part 8 next month. This extends this series to nine parts, the final instalment in November dealing with the transmitter.

#### NEED SOME POLYSTYRENE CEMENT?

If so, make it yourself, cheap, too

First off, get an empty nail polish bottle from the XYL. A few minutes with some acetone and you will have a clean and compact bottle, holding enough cement to last for some time, complete with applicator brush. If the bottle has a plastic insert which is intended to prevent spilling, discard this.

By some diligent shopping in one of the chain stores, you will discover some small cheap article made of clear polystyrene. Since this is likely to be an attractive item in the eyes of either the XYL or junior op., keep it from view until you get home. Now cut pieces from this article, side-cutters are best for this job, the pieces sufficiently small to go into the nail polish bottle.

Fill the bottle with chloroform except for a space of about 1" at the top. Put in the pieces of poly, which will dissolve in an hour or two.

The polystyrene to chloroform ratio is purely a matter of preference, but a fairly thick solution is best for coil doping. On the other hand, you will use most of this cement for repairing many of the plastic toys, rattles, refrigerator dishes, etc., which are available these days; for this a thin solution is better. The writer's junior op. has a plastic duck, essential bath equipment, of course, which has been repaired 17 times to date. Oh yes—clear poly is recommended partly to avoid any possible trouble with dye material where there is r.f., and also because pink cement looks somewhat out of place on a yellow duck!

If you want a slow-drying solvent, use xylol. For a quick-drying solvent, use tri-chlor-ethylene.

—Reprinted from "Break In," Jan., '58.

## Low Drift Crystals

FOR  
AMATEUR BANDS

ACCURACY 0.02% OF  
STATED FREQUENCY

3.5 Mc. and 7 Mc.

Unmounted ..... £2 10 0

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12.5 and 14 Mc. Fundamental  
Crystals, "Low Drift"  
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CANTERBURY, E.7,  
VICTORIA

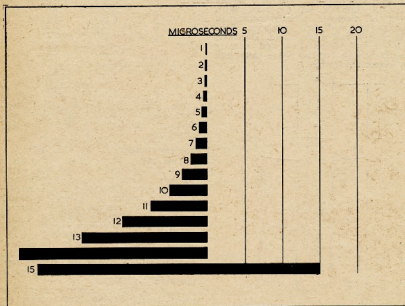


FIG 39—STREAKING CHART

# MEET THE OTHER AMATEUR AND HIS STATION

## ARNOLD HOLST\* VK3OH

**A**RNOLD Holst was born in Ballarat, Vic., in 1897 and is the eldest of three pioneer Ham brothers—Arnold, Hector (deceased), and Otto (VK3BY). Arnold's licence was issued in January 1914 with the call sign XPH. From 1916 to 1919 he saw service in the 1st Australian Wireless Signal Squadron in Mesopotamia and Persia using mobile Marconi 1½kw. and ½kw. spark transmitters.

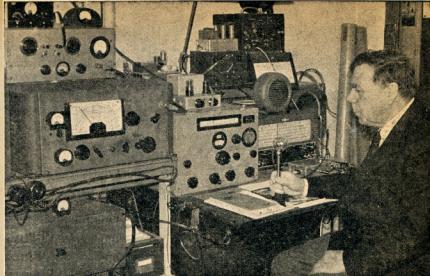
Arnold became active again about three years ago and is still happy to feel a morse key under his fist.

The five-band 100 watt transmitter uses a Gelofo v.f.o. unit into a pair of parallel 6146s with pi output.

The unit above the transmitter contains a low-pass filter for t.v.i., reflected power meter and outgoing power meter, and an all-band aerial coupler. Sitting on top of this is a percentage modulation meter and the matching box of the Panda G4ZU beam.

Below the transmitter is a Type "S" power pack which supplies h.t. for the 6146s only and 12 volt relay supply.

\*10 Flintoft Avenue, Toorak, Vic.



The Gelofo h.t. supply power pack is out of the picture. Also not in view is the modulator using 807s in class B zero bias and its power pack.

The receivers are Eddystone 680X and Marconi CR100.

The antenna system consists of a Panda G4ZU beam for 20, 15 and 10 meters and a 67 ft. long horizontal ended through a linear transformer, 34 ft. long and 300 ohm ribbon for 40 metres.

The shack is an upstairs room in the house. The mast for the beam is attached to the house about six feet from the shack window and rests in a car steering box, the column of which is brought through a hole in the window frame.

The long tube-like objects against the corner of the shack are not old tuning inductances for 100,000 metres, but rolls of artist's canvas. Painting and sketching in oils shares with Ham Radio VK3OH's spare time.

### SPECIAL ISSUE OF "AMATEUR RADIO" NEXT MONTH

With the October issue, "Amateur Radio" celebrates the 25th Anniversary of its publication as the official journal of the Wireless Institute of Australia. The Publications Committee is grateful to J. H. Magrath & Co. Pty. Ltd. for vacating the front cover so that a special design, in keeping with 25 years of service to the Amateur, can be printed thereon.

Through the co-operation of old and new advertisers, many more pages will be included in this special edition. Featured articles will be:

- ★ An H.F. Transistor Receiver.
- ★ The W.I.C.E.N. V.H.F. Communicator.
- ★ Construction of a Grid Dip Oscillator.
- ★ Oscillator and use of same.
- ★ A Video Oscilloscope in the series of Amateur Television.

In addition many more articles and items of general interest will be included.

May we suggest that you tell your friends so that they will not miss this issue. As only a limited quantity of extra copies will be printed, it will be to their advantage if they order their copy of the October issue of "Amateur Radio" in advance.

Maybe you would like some extra copies for your Overseas Amateur friends. If so, place your order immediately with the W.I.A., Victorian Division, 191 Queen St., Melbourne, C.I., and we will post a copy direct, for the sum of 1/9 including postage.

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U.H.F. Transmitter, consisting of cavity type osc., 807 p.a., 230v. a.c., h.t. 1700v. 150-200 mA. Approx. operating freq. 3500 Mc. £5/0/0.

U.H.F. Receiver, cavity type osc., motor and manual tuning. Six stages of i.f. at 45.5 Mc., operating freq. 3500 Mc. Some at £4/0/0, others £5/0/0.

Test Oscillator Unit, 230v. a.c. — 300v. (approx.) 100 mA. Rect. 5U4G. Test freq. 800 c.p.s. and 1600 c.p.s. Host of useful parts, £4/0/0.

Power Transformers, 230v. a.c. input. Double wound sec. 155v. each, 200 mills, £1/0/0.

Fil. Transformer, 230v. input, two 6.3v. at 1.7 amp., two 6.3v. 0.6 amp., one 6.3v. at 10 amp., 35/-.

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Six inch C.R.O. Indicator Unit, tube ACR13, own power supply, 2500v. d.c. (including two EF50s). Excellent for modulation indicator, panadapter, etc. £10/0/0 each.

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# VK-ZL DX CONTEST, 1958

Note changes in scoring for VK-ZL stations. These should make the Contest more interesting. Note overseas scoring different to that used by VK-ZL stations.

N.Z.A.R.T. and W.I.A., the National Amateur Organisations in New Zealand and Australia invite world-wide participation in this year's VK-ZL DX Contest.

**Objects:** For the world to contact VK and ZL stations and vice-versa.

**When? Phone—**24 hours from 1000 GMT, Saturday, 4th October, to 1000 GMT, Sunday, 5th October.

**C.w.—**24 hours from 1000 GMT, Saturday, 11th October, to 1000 GMT, Sunday, 12th October.

**Duration** for all contestants is 24 hours.

## RULES

1. There shall be three main sections to the Contest—

(a) Transmitting Phone.

(b) Transmitting C.w.

(c) Receiving—Phone and C.w.

2. The Contest is open to all licensed Amateur transmitting stations in any part of the world. No prior entry need be made. Mobile Marine or other non-land based stations are not permitted to enter the Contest.

3. All Amateur frequency bands may be used, but no cross-band operating is permitted.

4. C.w. will be used for the second week-end and Phone for the first week-end. Stations entering for both Phone and C.w. must submit entirely separate logs for each.

5. Only one contact per band is permitted with any one station for Contest purposes.

6. Only one licensed Amateur is permitted to operate any one station under the owner's call sign. Should two or more operate any particular station, each will be considered a competitor, and must submit a separate log under his own call sign.

7. Entrants must operate within the terms of their licences.

8. **Cyphers:** Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of five or six figures will be made up of the RS (telemetry) or RST (c.w.) reports plus three figures which may begin with any number between 001 and 100 for the first contact, and which will increase in value by one for each successive contact, e.g. if the number chosen for the contact is 053, then for the second contact the number must be 054, for the third 055, and so on. If any contestant reaches 999, he will start again with 001.

### 9. Scoring:

(a) **Overseas Stations:** One point will be scored for each contact on a specific band with any VK-ZL district. The final score will be derived by multiplying the total contacts on all bands by the total number of VK-ZL districts worked on all bands. These are ZL1, 2, 3, 4, 5, VK0, 1, 2, 3, 4, 5, 6, 7, 9.

(b) **VK-ZL Stations:** FIVE points for each contact on a specific band with

an overseas station and in addition, for each new country worked on that band, BONUS points on the following scale will be added—

1st contact 50 points.

2nd contact 40 points.

3rd contact 30 points.

4th contact 20 points.

5th contact 10 points.

For this purpose the A.R.R.L. countries list will be used with the exception that each call area in U.S.A. will count as a scoring area.

### 10. Logs:

(a) **Overseas Stations:** (i) Must show in this order—date, time in GMT, call sign of station contacted, serial number sent, serial received, band used. Underline each new VK-ZL district when contacted and use separate log for each band.

(ii) **Summary sheet** to show—call sign, name and address (block letters), details of rig, TOTAL SCORE by showing total of districts worked on all bands and total contacts on all bands. (Districts multiplied by contacts equals Total Score.)

(b) **VK-ZL Stations:** (i) Must show in this order—date, time in GMT, call sign of station contacted, serial number sent, serial number received, band of operation, contact points, bonus points. Use a separate log for each band.

(ii) **Summary sheet** to show call sign name and address in block letters, and score for each band by adding contact points and bonus points for that band and TOTAL SCORE by adding scores together. Details of equipment used—receiver, antennae, transmitter and power used.

11. Declaration to be attached to all logs: I hereby certify that I have operated in accordance with the rules and spirit of the contest.

12. The right is reserved to disqualify any entrant who, during the contest, has not observed regulations or who has consistently departed from the accepted code of operating ethics.

13. The ruling of the Executive Council N.Z.A.R.T. will be final.

14. **Awards:** (a) VK-ZL Stations: Certificates will be awarded by N.Z.A.R.T. to the top scorer on each band and the top scorer in each VK-ZL district. The top scoring ZL in c.w. also in Phone will receive a suitable plaque.

(b) Overseas Stations: Certificates to the top scorer in each scoring area. Additional certificates will be awarded depending on the number of logs received, e.g. to high scorers on different bands and place winners.

15. **Entries** from VK-ZL stations must reach N.Z.A.R.T. Contest Manager, ZL2GX, 86 Lytton Rd., Gisborne, N.Z., before 20th December, 1958. From Overseas stations must reach N.Z.A.R.T., Box 489, Wellington, N.Z., before 23rd January, 1959.

## RECEIVING SECTION

1. The rules are the same as for the transmitting section, but it is open to all members of any Short Wave Listeners' Society in the world. No transmitting station is permitted to enter this section.

2. The Contest times and logging of stations on each band per week-end are as for the transmitting section.

3. To count for points, logs will take the same form as for the transmitting section but will omit the serial number received. Logs must show the call sign of the station heard (instead of "work-ed"), the serial number sent by it, and the call sign of the station being called.

Scoring will be on the same basis as for transmitting stations. It is not sufficient to log a CQ.

4. VK receiving stations may log overseas and ZL stations, while ZL receiving stations may log overseas and VK stations.

5. Certificates will be awarded to the highest scorers on the same basis as for the transmitting stations.

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# PEOPLE WHO KNOW....



## The Engineer

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To the radio engineer, the "Broadcasting Transmitter Installation" shown above is the very heart of the broadcasting station. Without this complex piece of equipment, the wide variety of programmes produced in the studio could never be transmitted.

A most interesting fact concerning transmitter operation is that, like home radio sets, it depends on reliable electronic valves for continuous, trouble-free operation. A further interesting fact is that the Australian valve most used in equipment of this type is Radiotron. Follow the example of the Australian Radio engineers:

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VCS. 95

# NATIONAL FIELD DAY, 1959

(Draft Rules to be ratified by all Divisions on or before 30th September, 1958)

The Federal Contest Committee of the Wireless Institute of Australia invites all operators of portable, mobile and fixed Amateur stations to participate in the 1959 National Field Day Contest.

**Objects:** The operators of portable and mobile stations within the Commonwealth and its Mandated Territories will endeavour to contact other portable, mobile and fixed stations, both within their own State and in other parts of the Commonwealth.

**Date of Contest:** The Contest will be held on the Sunday preceding Australia Day, that is 25th January, 1959.

**Duration:** The Contest will commence at 0900 hours and end at 2100 hours E.A.S.T. on the above date.

## RULES

1. The Contest shall be an Open Contest, divided into the following Sections:

### A.—Single Operator—Transmitting:

- (1) Portable or Mobile H.F.
- (2) " " V.H.F.
- (3) Fixed H.F. " V.H.F.
- (4) " " V.H.F.

### B.—Multiple Operators—Transmitting

- (1) Portable or Mobile H.F.
- (2) " " V.H.F.
- (3) Fixed H.F. " V.H.F.
- (4) " " V.H.F.

### C.—Receiving:

- (1) Fixed or Portable H.F. and V.H.F.

2. All Australian Amateurs may enter the Contest. Mobile or Portable Stations are limited to an input power, with aerial connected of 25 watts to the final stage. This power shall not be derived from either private or public mains.

A Portable or Mobile Station shall not be located within a radius of one (1) mile from the home(s) of the operator(s), nor be situated in any occupied dwelling or building.

No apparatus shall be set up at the site selected for portable operation earlier than 24 hours before the commencement of the Contest.

A Portable Station may be moved from one site to another during the Contest.

More than one transmitter may be used and in the case of the multiple operators' section, several bands may be used simultaneously.

3. All Amateur frequency bands may be used, but no cross-band operating is permitted.

4. Amateurs may enter for one of the above sections listed in Rule 1. Any emission may be used during the Con-

test providing all such emissions comply with paragraphs 85, 86 and 87 of the current Regulations.

5. Only one contact per station per band is allowed and arrangements for schedules for contacts on other bands is not permitted.

6. More than one operator may participate in the operation of the Portable or Mobile Station provided that all operators are licenced Amateurs. (Refer also to Rule 14.)

7. Entrants must operate within the terms of their licences.

8. **Cyphers:** Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of five or six figures will be made up of the RS (telemetry) or RST (c.w.) report plus three figures which may begin with any number between 001 and 100 for the first contact and which will increase in value by one for each successive contact, e.g. if the number chosen for the first contact is 053, then for the second contact the number is 054, for the third 055 and so on. If any contestant reaches 999 he will start again at 001.

For checking purposes only, the location of the Portable or Mobile Station worked should be shown alongside each contact in the log.

9. **Entries** must be set out as shown in the example, using only one side of the paper. Entries must be postmarked not later than Saturday, 14th February, 1959, and addressed to the Federal Contest Committee, W.I.A., Box 1234K, G.P.O., Adelaide, South Australia.

10. **Scoring** will be based on the table shown.

## Scoring Table

### Portable and Mobile Stations:

- (a) For contacts with Fixed Stations within the competitor's own State ..... 2 points.
- (b) For contacts with Fixed Stations outside the competitor's own State ..... 3 points.
- (c) For contacts with other Portable or Mobile Stations within the same State ..... 5 points.
- (d) For contacts with other Portable or Mobile Stations outside the competitor's own State ..... 10 points.

### Fixed Stations:

- (e) For contacts with Portable and Mobile Stations in the Contest within the same State ..... 2 points.
- (f) For contacts with Portable and Mobile Stations in the Contest outside of the State ..... 5 points.

The following constitute Call Areas: VK1 (A.C.T.) and VK2 combined, VK3,

VK4, VK5 (South Australia), VK5 (Northern Territory), VK6, VK7, and VK9.

11. **Logs:** All logs shall be set out as in the sample shown and in addition will carry a front sheet showing the following information:

Name ..... Section .....  
Address ..... Call Sign .....  
Call Signs of other Operators .....  
Location(s) of Portable Station .....  
from ..... hours to ..... hours  
from ..... hours to ..... hours.

Portable or Mobile Stations to include on this front sheet a brief description of the equipment used including the h.t. voltage and power input to the final amplifier of the transmitter.

**Declaration:** I hereby certify that I have operated in accordance with the rules and spirit of the Contest.

Signed .....

Date .....

12. The right is reserved to disqualify any entrant who, during the Contest, has not observed regulations or who has consistently departed from the accepted code of operating ethics. Portable procedure must be used at all times.

13. The ruling of the Federal Contest Committee of the W.I.A. will be final. No dispute will be entered into.

14. **Awards:** Certificates will be awarded to the highest scorer in each section set out in Rule 1.

Certificates will also be awarded to the highest scorer in each State in each section if the scoring is considered adequate.

Further certificates may be granted at the discretion of the Contest Committee.

In the case of a winning station being manned by more than one operator, each operator will receive a certificate provided that he has contacted at least 25% of the stations submitted on the log, and that he has signed the log declaring this to be true.

## RECEIVING SECTION

1. The rules are the same as for the transmitting sections and it is open to all Short Wave Listeners in the Commonwealth and Mandated Territories.

2. Contest times and logging of stations on each band are as for the transmitting section.

3. To count for points, logs will take the same form as for the transmitting section, but will omit the serial number received. Logs must show the call sign and location of the station heard (instead of worked), the serial number

(Continued on Page 17)

## EXAMPLE OF TRANSMITTING LOG

Date/Time E.A.S.T.	Band	Emission	Call Sign	RST/NR. Sent	RST/NR. Rcvd.	Location Station Worked	Points Claim.	Blank

Note.—The standard W.I.A. Log Sheet follows the above form.

## EXAMPLE OF RECEIVING LOG

Date/Time E.A.S.T.	Band	Call Sign Heard	RST/NR. Sent	Station Called	Location Station Heard	Points Claim.	Blank

Note.—The standard W.I.A. Log Sheet follows the above form.

## I.T.U. FUND DONATIONS

Listed below are further subscribers to the fund to send an Amateur delegate to the International Telecommunication Conference at Geneva in July 1959. The fund is steadily growing, but the initial influx of donors has decreased to a steady stream. There are still a large number of Institute members and others who, for various reasons, may not have yet sent in their donations. We sincerely enjoin them to make an effort to do so in the next month, for our aim is £2,500 to be raised by December. When it is considered that our delegate may have to remain in Geneva for a period of 3 to 5 months, our objective is not too high bearing in mind air fares, cost of living in Europe and compensation for salary loss.

Some queries have been received from contributors as to why their donations have not been previously acknowledged in this column as they donated early in the appeal. We can only apologise for these omissions by saying that these delays have occurred through remittance of monies from the Divisions. All donations received direct by the Federal Executive have been acknowledged without delay and will continue to do so.

Please keep your donations rolling in and forward to—

**Federal Secretary,**  
Box 2611W, G.P.O.,  
Melbourne, C.I. Vic.

The following is a list of contributions to 31st July, 1958:—

**£5/5/0**  
E. M. Farker, VK2HS; M. A. Brown, VK2OR;  
Geelong Amateur Radio Club, VK3ATL.

**£5/0/0**  
J. McN. Ferrier, VK3MC.

**£4/0/0**  
Victorian Far North Western Zone.

**£3/0/0**  
A. E. R. Wood, VK5ZAE.

**£2/2/0**  
E. H. Cox, VK1GU; M. Folie, VK3MZ; L. P. Moncur, VK3LN.

**£2/0/0**  
D. Soraghan, VK2PU; F. C. Tregurtha, VK-2FT; H. B. Bodkin, VK2KW; W. R. C. Stevenson, VK3AWS; A. W. H. Chandler, VK3LC; A. R. Williams, VK3WE; D. G. Bauleh, VK3CX; B. S. Bauleh, VK3CQ; N. J. G. Wetling, VK4WT; P. H. Syme, VK5KB; B. H. Bussenschutt, VK5OR; E. O'Connor, VK5BP.

**£1/12/0**  
B. H. Gates, VK6KJ.

**£1/10/0**  
M. H. Stuckey, VK2ARF; P. D. Williams, VK3HZ; A. C. Hawker, VK3UB; A. Heath, VK-5ZX; W. A. P. Luke, VK9WP.

**£1/5/0**  
A. H. Sandilands, VK0AS; G. Rutter, VK2CB.

**£1/1/0**  
K. G. Sablin, VK2AGS; J. B. Williams, VK-2AYW; K. Phillips, VK3AEP; R. W. Easterbrook, VK3RM; D. H. V. Rankin, VK3ZAG; A. Prichard, VK3CP; R. W. Badrock, VK3ZCG; D. A. Wardlaw, VK3ADW; P. W. Hay, VK4PH; L. H. Cox, VK4LE; H. J. Townsend, VK5HT; R. G. Haskard, VK5RH; A. E. Shepard, VK5DC; I. Thomas, VK5IT; D. Couch, VK6WT.

**£1/0/0**  
R. May, VK1FM.  
K. Mitchellhill, VK1ANU; T. Bremner, VK-2AHV; T. Stockman, VK2ATS; O. Oliver, VK-

2AZX; D. Vaughan, VK2FY; G. Hodgson, VK2OH; C. G. Smith, VK2VT; G. Chapman, VK2PT; S. Ward, VK3SW; T. Thorpe, VK2T; W. Wilson, VK2XK; R. Reynolds, VK2AFR; H. Harman, VK3GH; H. Sargent, VK3HM; T. Newport, VK3FP; J. Baker, VK3AK; A. N. Laffman, VK3APL; G. Wheaton, VK3AAW.

K. Pincoff, VK3AFJ; L. Weller, VK3AIW; G. Fowles, VK3AMF; R. Pope, VK3ARP; R. Stephen, VK3ARS; S. Clark, VK3ASC; A. Jack, VK3AU; T. Culshaw, VK3AV; T. Baker, VK3DK; G. Lance, VK3DS; A. Zander, VK3PG; A. Buest, VK3ZBZ; R. Rutledge, VK3EQ; N. Folshead, VK3AAI; T. Challis, VK-3AAT; R. Abbott, VK3AB; C. Arty, VK-3AJA; K. Lloyd, VK3AKF; J. Fryer, VK3AQF; C. Pickering, VK3ATP; R. Burbridge, VK3AVB; G. Mackay, VK3AW; S. Bryant, VK3CI; H. Hodge, VK3HE; C. Rainbow, VK3IR; A. Kissick, VK3KB; R. Fisher, VK3OM; R. Bowen, VK3ZAD; A. Bridgdon, VK3ZCF; D. Johns, VK3ZD; D. Watson, VK3ZER; F. O'Donnell, VK3ZU; G. Bradnock, VK3AGI; H. Kellas, VK3AHK; L. Burston, VK3AGB; G. Turner, VK3GN; Mrs. M. Williamson, VK3HQ; W. Iliffe, VK3JO; R. Sanker, VK3XP; D. Tanner, VK3ZAT; G. Sheeran, VK3AGS; H. Gale, VK-3AJG; J. Spark, VK3AJK; W. Sleviera, VK3CB; L. Thomson, VK3CB; J. Mitchellhill, VK3CM; L. Money, VK3MY; C. Hyatt, VK3XH; D. Hale, VK3DE; A. Giddings, VK3DG; G. Kidson, VK3—; C. Stilwell, VK3ACN; B. Gillies, VK3AGY; I. Berwick, VK3ALZ; P. Linden, VK3ZAF; A. R. Adam.

Central Technical College, VK4CT; A. Price, VK4PA; H. Hilder, VK4HH; H. Larsen, VK-4JW; V. Green, VK4VE; C. Goodall, VK4GA; H. Dearness, VK4KW; R. Wilson, VK4SW; K. Hawkes, VK4HP; M. Wratten, VK4MW; N. Dangerfield, VK4ND; J. Saunders, VK4ZBR; R. Denby, VK4AB; A. Couper (deceased), VK4BY; J. Taylor, VK4JT; I. Johnson, VK4KL; A. Morrison, VK4MA; M. Hudson, VK4MH; A. Smart, VK4SM; R. Stack, VK4TK; K. Nutt, VK4KD; B. Holmes, VK4ZW; C. Burns, VK-4ZY; R. Fitzsimmons; D. Gibb; C. Vaughtin, G. Mulreath, VK3ZCM; A. Williams, VK-5BO; J. Sheard, VK3JA; D. Pitt, VK3ZBG; R. Bell, VK3NB; L. Coombe, VK5ZBC; H. Roberts, VK5MY; A. Powell, VK5NP; G. Sappalizer, VK5SS; B. Edwards, VK5—; J. Trevor, VK5AM; B. Austin, VK5CA; G. Stallard, VK5ES; P. Tapley, VK5PT; G. Mathews, VK5GS; J. McAllister, VK5JO; C. Leonard, VK5LT; R. Roper, VK5PU; P. O'Connor, VK-5US; L. Wallbridge, VK5UX; G. P. Bowen, VK5XY; R. Hercules, VK5ZAR; R. G. Bishop; A. R. Haig; R. K. Johnson.

M. Saw, VK5SM; H. Stephens, VK5ZZ; R. Downsett, VK5RD; A. Eder, VK6ZBE; F. Wright, VK6FR.

K. McCracken, VK1KM; D. M. Sloman.

W. Bock, VK9KG.

Under £1/0/0  
P. Lowe, VK3ZDO (10/-).

### Amendments to Previous Lists:

July List: Delete reference to VK2GK, J. H. Macmillan, and insert instead: V. J. McMillan, VK3AWN, £1.

Amend R. Beasley, VK2VD, to read R. Beasley, VK2XP, £1.

Amend W. A. Cooper, VK2AQX, to read W. A. Cooper, VK2AQI, £1.

The progressive total as at the 31st July is £1,344/2/0.

### NATIONAL FIELD DAY, 1959

(Continued from Page 10)

ber sent by it and the call sign of the station being called.

Scoring for both Fixed and Portable Receiving Stations will be on the same basis as for transmitting stations. It is not sufficient to log a station calling CQ.

4. Conditions relating to location and power supply requirements of Portable or Mobile Receiving Stations are as for transmitting stations outlined in Rule 2.

5. A station heard may be logged only once for each band.

6. Awards: Certificates will be awarded to the highest scorer, and the highest scorer in each State.

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★ Should you have the materials for that certain project, but do not have the time or are so placed that you are unable to complete the job, drop us a line and we will be pleased to assist.

★ Should you also have any equipment you would care to sell or exchange, please write giving all the necessary details including the price. An effort will then be made to include your item or items in the following month's advertisement.

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# S.W.L.

**Ian J. Hunt, WIA-L3007**  
211 St. George Road,  
Northcote, N.16, Vic.

First for this issue comes a letter from Don Granley of Melbourne, N.S.W. He states that he has been flat out preparing for the R.D. Contest which, of course, will be past by the time you read these notes. A complete overhaul of all equipment has been his aim. Lots of rain has kept Don indoors for the past month and as a result he has heard over 140. He also tells me that Rod Bent, of Albury, who father manages the station where Don is employed, has constructed a small transistor rx to cover the 40, 80 and 20 mX Ham bands.

Eric Trebilcock has forwarded details of a Japanese s.w.l. who would like to correspond with s.w.l.s in VK. He is Ketsji Shigetatsu, 180 Noshio Kiyose, Kitatama, Tokyo, Japan. He is interested in exchanging Amateur radio periodicals, photographs and call books. So if you wish, go ahead and drop him a line. Thanks very much for your note, Eric.

John Wallace, who is located in Canterbury, Meib., has also sent me a letter stating that he is interested in the S.w.l. Group. Welcome to you John, and hope to see you come along to our meetings. This year he held the last Tuesday of each month at 8 p.m. at the W.I.A. Rooms, 191 Queen St., Melbourne.

Dave Jenkin, of Orboist, is again back on the air, after a few months away and is preparing for the R.D. Contest. He has been very busy modifying his new AR7 rx in accordance with details recently published in "A.R.N." He was very lucky to find his great pal, Sticker (a cattle dog) which strayed whilst Dave was down in the big city. Dave has to rise very early each morning to milk the cows, but always seems to find time to drop me a line. How about some of you others doing likewise?

Two letters have been received this month from the beautiful town of Geelong, these from Horace Barling and Bill 3BU. Horace is attempting to make the best of things, but the weather is not helping him. He is very happy to receive a visit just recently from 3BU, 3IC and 3ALG, of the Geelong Radio Club, and fills me that they are very keen. I loaned him a rx which knocks spots off the Zenith which was in use before. I hope those chaps are gratified, having been of assistance to an s.w.l. who was definitely a person in need. Good luck to you fellows and thanks on behalf of Horace.

Bill 3BU, in his letter, has told me of some of the things he has done to improve his AR3900 rx. He has 6BA6s as r.f. stages and a 6AR5 as a mixer, but thinks that an 8C1 as a detector would also work well in this position. He took the loading resistor off the last i.f. stage and fitted a tone control and noise limiter. He found the xtal filter was too sharp and this could qualify for the Hints and Kinks section, shortened the xtal pins with fuse wire, this provided a very good move and giving a little extra gain on DX.

That then ends the letters for this month, and thanks to all who wrote to me.

## S.W.L. OF THE MONTH

This month we meet Maurice Cox, WIA-L3055. He is 32 years of age, married with a son and daughter. He is a South Australian by birth and spent his early days in Woodville, a suburb of Adelaide. When young, he spent great amounts of time playing around with a dual wave rx at home, but gave it away and joined the R.A.N. at 17½ years of age as a sick berth attendant. He became interested again in radio in 1959 and has since used the Marconi R1155, AR8 and BC342N type rx's. He is very keen on playing around with antennae and books becoming a specialist on the subject.

He has been a member of the VK3 Group for 18 months and is looking forward to getting his A.O.C.P. He is at present Acting Secretary of the VK3 Group. Only recently has he become interested in collecting QSL cards and already has a score of 56 to his credit.

Once a keen cricketer and model railway enthusiast, he has given these away for s.w.l. work. He not only listens to Amateur Stations but to the s.w.l. broadcast stations as well and has been made an official reporter for Radio Japan and the Canadian Broadcasting Corporation. Maurice works as a clerk at the Repatriation Dept. and lives in the Olympic

Village, West Heidelberg, where the Russian Olympic team were billeted. He has not, however, yet evidenced the endurance of Vladimir Kuts, but hopes to emulate a similar feat during the R.D. Contest.

Maurice has a very comprehensive log and indexing system, but is not too happy about the number of VK Amateurs who don't QSL when return postage is enclosed. His present gear consists of a BC342N rx, a 6AR5 mixer-osc. converter covering from 16.2 to 32 Mc., whilst the antenna is a folded dipole for 20 mX made from 30 ohm ribbon. He is now in the process of putting up a 66 ft. windom antenna and building an antenna coupler.

## VK3 GROUP JULY MEETING

This meeting took the form of a rather night with 13 members present despite the bad weather. A newcomer was Arthur Brook, of Essendon, to whom we extend a hearty welcome to the Group. After general business was dispensed with, Ian Hunt told members a little about the I.T.U. Appeal and then everybody had a general earbash amongst themselves. The meeting ended with a session from 3WI with George 3WJ at the controls, many of the members being given the chance to participate in a QSO.

## CARD OF THE MONTH CONTEST

We have not yet received any details of similar contests run in the other Divisions, but would be very pleased to hear of some.

The card of the month for August in the VK3 Division resulted in a draw between Ian Hunt, with a card from 2X2TH, and John McEwen, with a card from FB5BC. A total of 10 cards were entered in this month's contest.

As mentioned in last month's notes, the VK3 Group President and Secretary sat for the July A.O.C.P. exam. You will be pleased no doubt to hear that both passed to qualify for the Limited ticket. Our congratulations are also passed to another VK3 member, Bert Stebbing, who passed at the examination set at Deniliquin whilst up there, and as well to Bob Wallace who had not quite got around to actually joining the Group but was just on the verge when he was posted in his Army job to Bundamba, up near the borders. So it looks as if there will soon be a few more chaps on the air to talk about the good times had with the S.w.l. Group. Be assured though that they are not going to stay on the v.h.f. bands, but intend to pass the more test now and get down to the h.f.s. to work some of that DX they have been hearing about so long.

Whilst talking about morse, let me drop a little hint which may be of use to you if you

wish to polish up your sending and have no audio oscillator. The idea is simply to tune to a steady unmodulated carrier, in my case I use the signal from our city Fire Brigade station which is usually unmodulated, switch on the key b.f.o. and key the resultant audio output. With my rx there are two headphone jacks in parallel and I use the phones in one for the key and the other for the audio. When it is left in the up position. To return the system to normal I have only to pull out the plug for the key and in the a.w.l. business again. I can assure you it is a very simple and yet useful idea.

So with that my friends I must conclude these notes for yet another month. I wish you the best of good luck with your listening and hope you have a good time during the R.D. Contest.

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## AUSTRALIAN NATIONAL ANTARCTIC RESEARCH EXPEDITIONS

# VACANCIES—Antarctic Division at MAWSON — DAVIS — WILKES — MACQUARIE ISLAND

Applications are invited for the undermentioned vacancies in the 1959 Expeditions to Mawson, Davis, Wilkes and Macquarie Island.

### PERIOD OF EMPLOYMENT

Two to four months preparatory work in Melbourne followed by approximately twelve months at the Station. Tentative sailing dates: Macquarie Island—early December, 1958; Mawson, Davis and Wilkes—late December, 1958. Whilst absent from Australia, kitting and maintenance are provided free by the Commonwealth, and there is an allowance of 37½% of salary up to a maximum of £275 per annum; in addition to which a district allowance of £275 per annum for married men, and £175 per annum for single men is paid. Recreation leave accrues at rate of five weeks per annum. Subject to the provisions of the Income Tax Assessment Act, Zone Allowance deduction of £180 may be allowable. Salaries commence within the appropriate range according to qualifications and experience. Employment will be in a temporary capacity under the Public Service Act 1932-1955.

### ★ PHYSICIST

**Positions:** Macquarie Island (1), Mawson (1), Wilkes (1).

**Duties:** To carry out research on Ionospheric, Cosmic Ray, and Auroral Phenomena involving operation and maintenance of radar, pulse counting, photo electric and other electronic equipment, photographic and spectrographic equipment.

**Qualifications:** University degree, preferably with honours, with Physics as a major subject (or equivalent). Sound knowledge of, and experience in, electronics.

**Salary per annum:** £1,416-£1,686.

### ★ TECHNICAL OFFICER

**Positions:** Macquarie Island (1), Mawson (2), Wilkes (1).

**Duties:** Responsible for functioning of Ionospheric, meteor radar, and/or other electronic equipment, participate in investigation of geophysical phenomena.

**Qualifications:** Sound training or laboratory and/or field experience in electronics, including pulse techniques, essential.

**Salary per annum:** £1,181-£1,421.

**Classification:** as Technical Officer Grade I, £1,181-£1,331, or Technical Officer Grade II, £1,331-£1,421, and commencing salary within those grades will be determined in accordance with experience and qualifications. Results or any academic studies should therefore be stated.

### ★ SUPERVISOR (RADIO)

**Positions:** Mawson (1), Davis (1), Wilkes (1), Macquarie Is. (1).  
**Duties:** To service and maintain radio, radiophone and rawin equipment and act as Senior Radio Telegraphist.

**Qualifications:** Applicants should state any appropriate licence or technical diploma held by them. A thorough knowledge of theoretical and practical electronics is essential, plus a First Class Commercial Operator's Certificate of Proficiency or equivalent service experience.

**Salary per annum:** £1,085-£1,115.

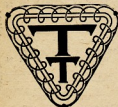
### ★ RADIO OFFICER

**Positions:** Mawson (2), Davis (1), Wilkes (2), Macquarie Is. (2).  
**Applicants** should possess Commercial Operator's Certificate of Proficiency or equivalent service experience, together with wide experience in operation and maintenance of ground installations.

**Salary per annum:** £945-£1,065.

Applicants must be in robust health and have experience in outdoor life such as ski-ing, mountaineering, bushwalking, etc. The successful applicants for the Physicists and Technical Officers positions will be required to commence duty as soon as possible. Applications, which must be accompanied by a recent photograph and the names of at least two referees, should reach—

The Director, Antarctic Division, Department of External Affairs, 187 Collins Street, Melbourne, by 16th Sept. '58.



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## FEDERAL

Fed. President: G. M. Hull, VK3ZS.  
Fed. Secretary: L. D. Bowie, VK3DU, Box 2611W, G.P.O., Melbourne, C.I. Vic.

**Federal Councils:**  
New South Wales—Bob Goddall, VK2ARG, Victoria—Dave Wardlaw, VK3ADW.  
Queensland—Arthur Wals, VK4AW.  
South Australia—Rex Richards, VK3DD.  
Western Australia—Ron Hugh, VK8KW.  
Tasmania—Doug Fisher, VK3AR.  
Papua-New Guinea—Russ Coleston, VK9XK.  
**Fed. Contest Committee:** Reg. Harris, VK3RR, Secretary, Box 123AK, G.P.O., Adelaide, S.A.  
**QSL Bureau:** R. E. Jones, VK3RJ, 23 Landale Street, Box Hill, E.I. Vic.  
**Awards Manager:** A. G. Weynton, VK3XU, 5 York Street, Bonbeach, Vic.

**NEW SOUTH WALES**  
President: Perc. Healy, VK3APJ.  
Secretary: Norm Beard, VK2ALJ, Box 1734, G.P.O., Sydney.

**Meeting Night:** Fourth Friday of each month at Science House, Gloucester Street, Sydney.  
**QSL Bureau:** Box 1734, G.P.O., Sydney. Frank Hind, VK3ALJ, Manager; assisted by Allan Smith, VK3AIR.

**Zone Correspondents:** North Coast and Tablelands: Noel Hanson, VK3AHH, Ryan Ave. West Kempsey; Hunter Branch: R. W. Rose, VK2AGP, 17 Brooks St., West Wallisland; Coasts and Lakes: H. Hawkins, VK3YLY, 10 Court Ave., Comstock; Western: W. Stitt, VK3JWH, "Cambajowa," Forbes; South Coast & Southern: E. Fisher, VK3B2, 2 Oxley St., Warrawong; 8th. Western: J. W. S. Edge, VK3AJO, Wallace St., Coolamon; Tamworth: S. Smith, VK3APS, 50 Upper St., Tamworth.

**VICTORIA**  
President: F. G. Hall, VK3YS.  
Secretary: J. R. Lancaster, VK3JL.

## FEDERAL

### RADIO SIGNAL REPORTING CODES

The Comité Consultatif International Radio C.C.I.R. in 1952 recommended that the SINPO and SINPFMO codes be used instead of the older Q and other codes in use. The signal report consists of the code word SINPO or SINPFMO followed by the five or eight characteristics of the signal code. The letter X is used instead of a numeral for characteristics not rated.

## CONTEST CALENDAR

Compiled by W.I.A. Fed. Contest Com.

★

### R.D. CONTEST:

Returns of Letters: Postmarked not later 6th Sept, 1958, to F.C.C., Box 123AK, G.P.O., Adelaide.

### VK-ZL DX CONTEST:

Dates: Phone—4th-6th Oct., 1958.  
C.w.—11th-12th Oct., 1958.  
Bands: All h.f. bands (including 11 mc.).  
Rules: See new Rules this issue.  
Legs: To Contest Manager, N.Z.A.R.T.

### "CQ" WORLD-WIDE:

Dates: Phone—2nd Oct., Oct. 25, to 0200 GMT, Oct. 27.  
C.w.—0200 GMT, Nov. 29, to 0200 GMT, Dec. 1.

Bands: All h.f. bands (including 11 mc.).  
Rules: No change from 1957 except for minimum operating time of 12 hrs. to qualify for an award. (Note Rule 8, sections 6 and 7.) Rules will appear in this journal next month.

### R.S.G.B. TELEPHONY CONTEST

Dates: Nov. 22 and 23.  
Rules: Restricted.  
Returns: Same as for 1957 except for scoring bonus for working G3 stations.

### ROSS HULL MEMORIAL V.H.F.:

Dates: 1st Dec., 1958, to 31st Jan., 1959.  
Bands: All v.h.f. bands.  
Returns: Same as for 1956-57.

### NATIONAL FIELD DAY:

Date: Sunday, 25th January, 1959.  
Bands: (1) H.f. (2) V.h.f.  
Rules: Note changes for ratification this issue. Returns Sept. 30.

Although the code word SINPFMO is intended for telephony, either code word may be used for telephony or telephony.

Rating	Signal	Interference	Noise
1	Excellent	QRM	QRN
2	Good	Nil	Nil
3	Fair	Slight	Slight
4	Poor	Moderate	Moderate
5	Very poor	Severe	Severe
6	Unusable	Extreme	Extreme

Rating	Propagation	Overall
1	Excellent	Excellent
2	Good	Good
3	Fair	Fair
4	Poor	Poor
5	Very poor	Unusable

Example: Signal report SINPO 555X4 would mean excellent signal strength, moderate QRM; no QRN, propagation disturbance not rated, and overall readability good.

In the case of the code word SINPFMO, the letters S, I, N, P, and O have the same meaning as for the SINPO code, but in addition the letters F, E, and M have these additional meanings:

	F	E	M
Rating	Frequency	Modulation	Modulation
5	of Fading	Quality	Depth
5	Nil	Excellent	Maximum
4	Slow	Good	Good
3	Moderate	Fair	Fair
2	Fast	Poor	Poor or nil
1	Very fast	Very poor	Continuously

Example: Signal report for telephony of SINPFMO 34254453 would mean fair signal strength, slight QRM, severe QRN, no propagation disturbance, low level, good quality of modulation, maximum depth of modulation, and fair overall rating or readability. The overall rating or readability of telephony of the letters F, E, and M is also interpreted as follows:

Rating	Operating Condition	Quality
1	Signal quality unaffected	Commercial
2	Signal quality slightly affected	Commercial
3	Signal quality seriously affected, channel unusable by experienced operators	Marginally commercial
4	Channel just usable	Not commercial
5	Channel unusable	Not commercial

## Z.Y. EXAMINATION

The Australian Broadcasting Control Board has notified the following candidates that they

Zone Correspondents: Maryborough: R. J. Glassop, VK4BG, 30 North St., Maryborough; Townsville: S. K. Wilson, VK4RW, Hogan St., Stuart, Townsville.

## SOUTH AUSTRALIA

President: B. W. Austin, VK3CA.  
Secretary: J. C. Haseldine, VK3JC, Box 123AK, G.P.O., Adelaide. Telephone: M 7851.  
**Meeting Night:** Second Tuesday of each month at 17 Waymouth St., Adelaide.  
**Divisional Sub-Editor:** E. C. Daw, VK3EF, P.O. Box 44, Gawler, S.A.  
**QSL Bureau:** G. Luxton, VK3KH, 27 Belair Rd., West Mitcham, S.A. (Inwards & Outwards).

## WESTERN AUSTRALIA

President: L. Roeger, VK8HR.  
Secretary: J. R. Elms, VK8BE, Box N1002, G.P.O., Perth, W.A.  
**Meeting Night:** Third Tuesday of month at Perth Tech. College Annex, Mounts Bay Rd.  
**Divisional Sub-Editor:** J. R. Elms, VK8BE, 29 Central Road, Kalamunda.  
**QSL Bureau:** Jim Rumble, VK8RU, Box F319, G.P.O., Perth, W.A. (Inwards and Outwards).

## TASMANIA

President: P. E. L. Dunne, VKTPE.  
Secretary: K. E. Millin, VK7KA, Box 371B, G.P.O., Hobart.  
**Meeting Night:** First Wednesday of each month at 12 A.A. & Greville's 147 Liverpool St., Hobart.  
**Divisional Sub-Editor:** W. W. Watson, VK7TY, 51 Brookier Ave., Moonah.  
**QSL Bureau:** VK7JB, 29 Willowdene Ave., Lower Sandy Bay, Hobart.  
**Zone Correspondent:** North Western Zone—Terry Tong.

## PAPUA-NEW GUINEA

President: P. N. Man, VK9PN.  
Secretary: J. A. Greville, VK9LA-15004.  
**Divisional Sub-Editor:** R. Clark, WIA-15001, P.O. Box 204, Port Moresby.  
**QSL Bureau:** D. S. Brown, VK9SB.

were successful at the examination for the Television Operator's Certificate of Proficiency held in Sydney and Melbourne on 10th June, 1958.

**Sydney:** William Leonard Aubrey, James Peter Gey Cox, Ernest Casimir Crouch, Kevin Douglas Curran, Noel Stanley Hill, William John Hollister, Alex Richard Jenson, Owen Thomas Kavanagh, William John Lark, Milton Charles Moorhead, William Russell Nelson, David Barry Robinson, Quick Thomas Llewelyn Robson, Edward Hamilton Smith, Gordon Clive Snell, Cecil Snyder, Edward Lionel Kenneth Travers, Peter Andrew Tschachenko, John David Watson, William John Weller.

**Melbourne:** Donald Patrick John Davenport, Basil James Gilbert, Richard William Moncur Jones, Kevin Lo, Henry David Myers, James Edward Reilly, Walter Ernest Ritter, Harold Gilbert Smith, Edwin Charles Joseph Snell, Terence Leslie Stokes, Kenneth Owen Donald.

The examination was conducted by a Board of Examiners comprising officers of the Australian Broadcasting Commission, Mr. R. H. Mondell, of the Dept. of Technical Education, Sydney, and Mr. F. A. Kempson, of the Royal Melbourne Technical College.

Examinations are conducted twice yearly, on the second Tuesday of June and December. Applicants who have passed any sections of the examination on a previous occasion will be exempted from these sections for a period of 12 months, that is two half-yearly examinations succeeding the passing of the sections. The next examination will be held on 8th December, 1958, and applications for this examination must be lodged with the Secretary of the Board, 497 Collins Street, Melbourne, by 15th November, 1958.

## FEDERAL QSL BUREAU

Jack Elliott, ZL3CC, who has visited Australia several times, is inaugurating himself in a world tour in 1959. Itinerary takes in Sydney, Melbourne, Adelaide, Fremantle, Colombo, Port Said, Naples, Versailles, Gib-

## SILENT KEY

It is with deep regret that we record the passing of:—

VK4BW—Andy Couper.





At the recess, Sid JASC disposed of a box of wire oddsments which he had donated. The money to raise was given to the I.T.U. Fund. The recommendation was also put to Council that Institute funds be made available for this fund. Council reports that the fund now stands at the very handsome total of £1350. Don't let this deter you from sending that donation as we are not near the target of £2300 yet. Don't forget, also, that our cause is going to the front and we need more money to demonstrate that we have a use for our bands, so get on as often as possible and prove this point. Our cause is connected with the fact that we need the bands for our purposes, then our representative at I.T.U. is going to find it difficult to substantiate our claims. Incidentally, the P.M.G. has given his blessing to the proposal for a VK Amateur to attend I.T.U. as an observer, so things are moving in all spheres of this project.

Steps have been taken to protest against the latest directive that only English may be used from VK stations.

The next State Convention is to be held in Melbourne on 20th and 21st September.

Owing to school holidays, the next general meeting will be held on the second Wednesday of the month, 10th September, and the lecture will cover Fox and Transmitter Hunting, together with a demonstration of the gear in use on these activities.

#### MIDLANDS ZONE

Alteration to the zone hook-up night to Tuesday has not yet brought in those other calls we hoped to see, but when they remember that the second and fourth Tuesdays at 8.00 or 8.15 are the nights to be in, they are hopeful of a greater roll-up. In the meantime, those who attend spend a pleasant hour or two in an entertaining discussion, and we have time to be shared with the newcomers.

It appears that old age, or the law, has caught up with 3TG, as his car is off the road. It was seen going to the garage for a thorough check and prevented a few blisters on the toe. 3IZ is building a panadaptor, but is finding it difficult to get the right balance. After the meeting at Castlemeane last month, Peter drove home and arrived there without any feeling and little visibility through the wind screen. A has been installing a water for nights such as that, and we now have another happy operator on the air.

Neville 3ACN is re-building his s.s.b. rig and is higher than the night before. He is finally made his balanced modulator balance. This was after testing the original four diodes, which on test had forward and back conductance within about 400 ohms of each other. A visit to the local store, a box of diodes and a multi-meter eventually served for food and with reasonable tolerances. The rest of the rig has yet to be tested and it is hoped to report success next month.

When this zone was first formed it was advised that a frequency meter was allotted to it, but after a lot of enquiries and searching, it now appears that this frequency meter is really not needed. In the V.I. world, it just doesn't exist. However, one or two are owned by members of the zone, and these can be made available should any member require a frequency meter. A volunteer is doing frequency checks for the zone operators, preferably during the hook-ups.

#### SOUTH WESTERN ZONE

Well the zone has woken up after a short spell; the hook-ups have been sadly let down, but on 31st July it was a terrific night as all the most zone stations were on. We had Brian 3AGD, Gordon 3AGV, Chris 3AXU, John 3AGD (Voice of the Grampians), Kevin 3AKR, John 3ABR, Jim 3ABT, Jack 3ABT, and 3ABT 5-8 in Warrnambool and only using an 8 ft. whip, Bill 3XE, Gordon 3AGE, Leigh 3II, and Bob 3JC. Willie 3AWZ was missing; guess his bird family kept him busy.

I would like to remind all members not to forget the next Convention to be held in Ballarat in November. If anyone has the zone frequency meter could you please forward same to the Secretary, JAGE.

#### EASTERN ZONE

Only four bounds attended our last 2 mx fox hunt held at Maffra. This number was very disappointing as it turned out to be a very nice afternoon and the weather was very good. David 3DY, George 3ZCG, Fred 3ZEV and Ken Robertson as bounds.

Our next activities-day will be an all-band field day, held at Apex Park, along the Morwell River Road, near Bocarara, on Sept. 14. We would like to see all the Amateurs in the zone attend this field day, so bring along your wives and children, friends and portable rigs.

Meeting time will be at 10.30 a.m., having a picnic lunch beside the river at noon, a fishing trip and a cinema would not go amiss, so hoping to see you all there.

#### NORTH EASTERN ZONE

Gen. 3ADZ now using lighting plant to drive 750 rps plus a new tx. Best DX George. Keith 3JC is back on the air working the DX on 20 mx only. Arthur 3AWL now operating 80, 40 and 20 mx. Henry 3IIP working on 30 mx. Look for you on zone hook-up. Henry. Congratulations to 3FD and XYL-382 harmonic putting out a strong signal. Welcome to Jack 3API, being of luck on the 30 mx. regards to all members from Mawson, Doug VKOL looking for VK QSOs on 20 mx.

#### WESTERN ZONE

Pleased to hear that Gordon 3NX, of War-racknabell, is on the air again. He was very active before the war, but because of business in recent years has left little time for Ham Radio. However, he is using a Type 3 with a higher powered rig coming up in the near future. Chas 3IB, ex-3ACI, IAC QAB, is now settling back to work at one of the metropolitan b.c. stations. He recently made a holiday tour of New South Wales and Victoria where he paid visits to some of his Radio cobsers, who have also spent their share of time on islands in the Antarctic.

Sorry to say that Jim 3DP is on the sick list and certainly hope that by the time these notes go to press he will be fit and well again. Gordon 3GV, of Rainhill, is building up a switch network to change power supply to different transmitters. Guess he has it finished by now.

#### GEELONG AMATEUR RADIO CLUB

The Club activities have reached an all-time peak with 20 new members and a new set of officers for 1958-59. Our new President is Bob 3IC, Secretary Harry Michael, and Treasurer V. We attribute our outstanding burst of activity to the work of the officers of last year mainly, J. Barber, 3ABT, G. Clarke and Bob 3IC, and the energetic committee.

There has been a number of excellent lectures by various members. Vic. Clarke gave a talk and demonstration on setting loops. Mr. J. Beckingham continued this theme with particular aspects of mobile equipment. A tx hunt was held recently for an evening mobile exercise and the members found the tx concealed near the railway station.

The local members are very pleased with the results of the exercise and do bigger and better things with it this year.

A study group and Morse code class are in capable hands and we hope to have some more QRMT by the end of the year.

#### MOORABBIN AND DISTRICT RADIO CLUB

The blow has fallen at last! Our meeting place is down in the dust and we have to shift the scene of our activities, at least for the time being. One of our staunchest mem-

bers, Ed. Manifold, has kindly offered the use of his shack to tide us over until permanent accommodation can be obtained. Meetings will be reduced to once per month, on the third Friday of each month, at 267 Jasper Road, McKinnon.

At a last meeting, a sum of £5 was voted from Club funds as a contribution to the I.T.U. Delegate Fund.

Congratulations to our Vice-President, Jack Huxford, and member Max Dalton on gaining their two-letter call signs. There's going to be some mighty ear-bashing on 40 mx round Moorabbin and Highest in the near future!

.....

#### QUEENSLAND

The Council meeting on July 11 saw a good roll-up of Councillors, which was possibly due to the fact that the meeting was conducted in the lavish surroundings of the Y.M.C.A. dining room. The President, John 4FP, thanked Ron 4RO for attending the meeting in the capacity of liaison officer for the T.V.I. Committee. The minutes having been read and confirmed, councillors noted with interest and with pleasure that the northern boys have set a good example by their generous donations to the I.T.U. Fund. It was also noted that quite a few non-members have responded to the circular sent out by F.E. The support of member and non-member was greatly appreciated, and Council commends the interest taken in such an important matter as this. Keep it up boys!

Arthur 4AW received a letter from F.E. concerning the scarcity of tubes in India and the subsequent plight of the Indian Amateurs. Details of this have already been published in "A.R." Also, we were asked to remind Qld. Amateurs that a section will be devoted in "A.R." to a shack description with accompanying photographs. So what about it boys, spruce up the shack and have your picture took! (Photos with good contrast are required. The block will be donated to the Amateur for his use by the Publications Committee.)

Ron 4RO announced to Council that the T.V.I. Committee was back on the job. The Committee consists of Tibbits 4HR, as Chairman with 4RO, 4JE, 4SA, 4NO and Alan Smith, all raising to go. Council approved the purchase of several items of equipment and with this just around the corner, members are earnestly requested to co-operate to the full and become T.V.I. conscious. A meeting of the T.V.I. Committee will be called in the near future to discuss proposed policy, and we wish them every success as they've taken on quite a job.

Members will note with interest (perhaps) that the policy book has not been forgotten as the President John 4FP and his sub-committee have arranged further meetings at which all past Institute minutes are carefully read and compiled.

Also the task of determining all the Institute's assets has come up for consideration and a committee formed to investigate the matter.



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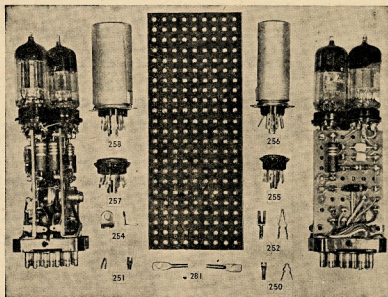
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Page 27

by the right combination of R and C gives that copy-book kingly we all like. No excuses fellow, you have named now.

A recent W.I.C.E.N. exercise with Mt. Loft as the centre passed off with great success on 6.5, 8.0 and 6.0. The boys who unthinkingly flung themselves for this task and brave the very inclement weather we have had lately to keep practicing so that they and their equipment will be able to render an emergency service worthy of the Institute.

## WESTERN AUSTRALIA

Your scribe being off on a final flip before he goes back to work after eight months holiday, no report on last meeting is forthcoming, this month. The matter of the member club, the Short Wave Group, was finalised, and numbers have now been issued. These take the form of those issued in other States, e.g. WIA-L601, etc. Financial members of the club are entitled to all privileges enjoyed by Associate members of the Division. We wish the listener boys (not to mention the YL) all the best of listening, and a very happy association with the Institute.

During my travels I enjoyed the hospitality of SCL and his XYL Roma. Ian was conducting a very nice house party. I started off in very wintry weather with a field strength meter hooked up to a loaded whip in his utility. This worked very well until the utility became unusable. I believe Ian has now attached his device to his tractor. Roma finds the vee beams very handy at times. When Ian is working South Africa, it is only necessary for her to connect the feeders of the 80 mx dipole to the kitchen stove and hey presto—dinner!

GBU, GGB and company conduct round tables on the v.h.f. bands. Some of these "coast to coast" hook-ups have to be heard to be believed. I have heard at times four stations all talking at once, and what's more, being heard. Triple duplex or triplex? I have still to find out the strength of a "three jersey" breeze.

A new voice has appeared on 80 in the person of a 24 year old lad, who says he has been working 24 hours a day, having concentrated on the higher bands. From reports he has really enjoyed his introduction to the band; so much so that he will give him the go-ahead to stay off for a night or two to make up for lost sleep. SLC, GBE and GNL were conducting a round table on 80 at 1815 the other morning. At the same time, 6CL could be heard on 40

working 7ZD, 6CR, and quite a lot of other stations. The new 75 ft. high is paying off. Nice work Ian.

6WL has a beautiful signal these days—on 18 watts. Getting very nice reports from VK3 who, I believe, has been working 6WL. It is impossible to run higher power. 6CA has been busy getting his tower into the air. It is now in position and he is waiting for a beam. I believe the crane driver was not so lucky though, it took him two days to get home when the job of the crane fell to it. To the great sorrow of many 6BOLs, 6BOL have done justice to the Olympic dash in his eagerness to get out of the way.

6SM has completed his new rig and is now running high power. 6VJ is another who has increased power, and is now running 100 watts plus. Bob Glover has received his call at long last, and is now working XN band. Mc, with the Perth boys. He has also been heard working 6TH in Brunswick and 6MG in Manjimup. I think this last contact would put new heart into Mac, who has not had much luck with 6Mx to date. 6EJ has appeared on the band after a long absence due to pressure of work on the properties. Jack is running a new modulator—a pair of 7Z20s. 6KO was heard the other day for the first time for nearly two years. Kevyn has been working temporarily in Melbourne, but has returned to Perth, and at Wembley. He has been busy setting up his gear and hopes to be fairly active again. Nice to see you back Kevyn.

6MTA has been busy building a new converter, which he hopes to have finished before the R.D. Contest. I had the pleasure of spending quite a few hours in his shack and note that Allan is getting things set up very nicely. Believe Allan has been getting among the 30 mx K band. He has also been working 6KX signals with a horizontally polarised bedstead. Think Len will be horizontally polarised the time he gets on to six, though. (Midnight horror indeed!)

Arrangements for the R.D. Contest are well under way in Sydney. The contest appears in print we will be awaiting a response, and other record roll up is expected from VK6 again, and we expect to be hard to beat. It is believed that about this time the contest work for at least 18 hours out of the 24, which should make things interesting.

Results of the contest are very encouraging so far. If you haven't made your donation yet, it's time you thought about it. It could be a good form of insurance. The thought of the contest is so well sign off till next month, chaps, wishing you all the best.

## TASMANIA

Alas! We have had to get a new correspondence and "young timer" correspondence. Tery, Tongs, was "docked in", but will endeavour to carry on the good work done by Len ex-TLS, who, as he mentioned last month, has left us and gone to VK6 land. We all hope to hear you on the air again soon Len.

Yet another Annual Meeting was held at Ulverston last night, and we were very well off our permanent meeting place. The meeting proceeded after everybody was warmed or otherwise by the beautiful fire. The minutes of previous meeting were read and correspondence, etc., was speedily disposed of and our Past President's report was read (I believe it was a very good one). (At this moment), a great job, Syd, a new President was elected after a secret ballot and Ted 7BJ was voted in with a good majority; congratulations. Our Secretary was elected and we were "ceremoniously" bundled into office once more and told he was good for another 20 years or more. You've had it, Max. Vice-Presidents, Syd 7SF, George 7XL and Lee 7KC, were duly elected and told they were good for at least 20 years. Deputy 7BR, tried to push "yours truly" into the Treasurer's job but without success, so he will have to get out another balance sheet next year. Licensed Hams were threatened with dire things if they didn't round the clock during the R.D. Contest—it's in the bag for VK7 if threats count for anything.

Jim 7JO and Athol 7LR have generously offered to help some of us associates to grasp a little more of the "know how" and quite a few intend being cranked at the exam in October. Therefore if the powers that be see fit, there'll soon be more dipoles on the coast than ivy on the wall.

The efforts of some of our YLs and XYLs in preparing supper for us were greatly appreciated; no need for breakfast next morning. There's nothing better than cream cake and radio round a good fire.

The inevitable auction took place after supper and it was hard to believe that so much

junk existed in Tassie. The disposal of all the lots proved a marathon for our President, auctioneer. Associate John Lee got a beautiful aerial complete with insulators—just right for the xtal set, John. Someone bought a venetian blind for his car and of course Secretary Max bought several transformers. He simply loves "boiling them down" and winding new ones—kerosene will shift that gooey stuff off your kitchen table Max. Also, Max's XYL declares that a morse key has now become standard equipment. I don't know when it was first used—certainly one way to learn the code. Our Treasurer reported about 2 db. gain in zone funds, which gives some idea of the quantity of "valuable gear" that is being bought.

Ken 7AI, operating on s.a.b. (the only one here in VK7 I believe), reports that our American friends will shift that gooey stuff off before breakfast. He is also tidying up a new 150w. final using 6146s; hope it functioned OK for the contest. Ken 7RN has his beam finished, and working the lot, with all sorts of things coming in and going out on it. Is it any good as a scarecrow, Roy? Sam 7SM, with only three States to get, should soon achieve his W.A.S. certificate now that he has his cubical quad in operation. Our L.v. enthusiasts are reporting good soundings in pictures. Keep trying chaps, new type of rx should result. The grape-vine, along with other things, is carrying whippers of several experiments with transistors. Best of luck.

## PAPUA-NEW GUINEA

The VK9 Division was shocked to learn of the passing of our old friend Andy 4BW. The VK9 Division has been very friendly to the many sincere friendships Andy had made on the bands. We in VK9 join with all members of the Institute in extending our deepest sympathies to Mrs. Couper.

## HAMADS

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A.W.A. Roster components for 17HP413 tube ..... £13/6/0

290 LONSDALE STREET, MELBOURNE

FB 3711



# 3 GELOSO V.F.O. UNITS

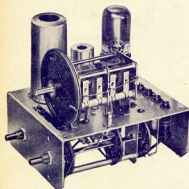
## for the Amateur

### MODEL 4/102 V.F.O. UNIT EXCITER

**Five Bands: 80, 40, 20, 15, 10 metres**

Using 6J5, 6AU6 and 6L6 Valves

- Instant change of frequency on any band by coil switching.
- Controllable output over entire tuning band.
- Single control full bandspread on each band.
- Capacitive output.
- Utmost frequency stability (plus or minus 200 c.p.s. on all bands).
- No plug-in coils required.
- Laboratory tested.
- Power supply required: 400 volts at 32-34 Ma.



4/102 V.F.O. UNIT EXCITER

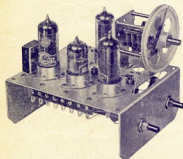
### MODEL 4/103 V.F.O. UNIT EXCITER

**Freq. Range: 144-148 Mc.**

**R.F. Power Output:** Sufficient to drive an 832 or 2E26.

**Valve Line-Up:** Two 6CL6 oscillator multipliers, one 12AT7 multiplier, one 57B3 driver.

The unit incorporates two different oscillator multipliers, one variable for establishing communication, one crystal-controlled fixed frequency oscillator for working.



4/103 V.F.O. UNIT EXCITER

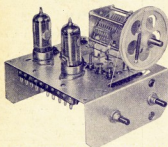
### MODEL 4/104 V.F.O. UNIT EXCITER

**Six Bands: 80, 40, 20, 15, 11, and 10 metres.**

**R.F. Power Output:** Sufficient to drive one 807 or 6146 for phone or c.w.

**Valve Line-Up:** 6CL6 oscillator, 57B3 driver.

This is an oscillator exciter of high stability, because of its conveniently selected C/L ratio and the 6CL6 oscillator tube employed.

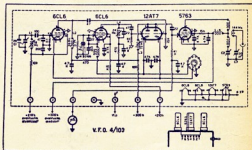


4/104 V.F.O. 6-BAND UNIT EXCITER

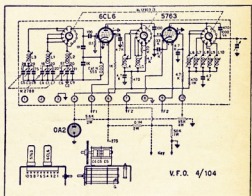
### PRICES

(Incl. Sales Tax; excluding Valves)

4/102	£10/4/9
available now	
4/103	£13/8/9
expected Sept.	
4/104	£11/3/9
expected Sept.	



CIRCUIT DIAGRAM FOR 4/103



CIRCUIT DIAGRAM FOR 4/104

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